GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXXXIX. No. 3485.] LONDON, MARCH 5, 1930. [82ND YEAR. PRICE 1s.

"Foochow"

"More than Paint"

PERMANENT GREEN PAINTS

The Indestructible Protective film

IS A GAS HOLDER A THING OF BEAUTY?

It has been recently suggested that a gasometer could be a thing of beauty! At any rate it need no longer be unsightly if it is painted with "FOOCHOW" PERMANENT GREENS, and may be made to harmonise with the surrounding countryside.

Many leading Gas Works employ "FOOCHOW" PERMANENT GREENS. They are completely stable against gas works fumes. Further, they are fast to sea air and sunlight. For all industrial structures these Anti-corrosive Greens have proved entirely suitable—being in every way at least as durable if not more durable than red oxide.

There is extra economy as well as extra protection in "FOOCHOW" PERMANENT GREENS owing to exceptional covering and obliterating power. Let us send you samples, and names of Gas Works where used.

DONALD MACPHERSON & Co LTD

MITCHAM, LONDON & KNOTT MILL, MANCHESTER

PATENT RETORTS LTD.

SUPPLIERS OF PLANTS FOR

COMPLETE GASIFICATION OF COAL

5, VICTORIA STREET, LONDON, S.W.1.

JOSEPH EVANS & SONS, (WOLVERHAMPTON) LTD.

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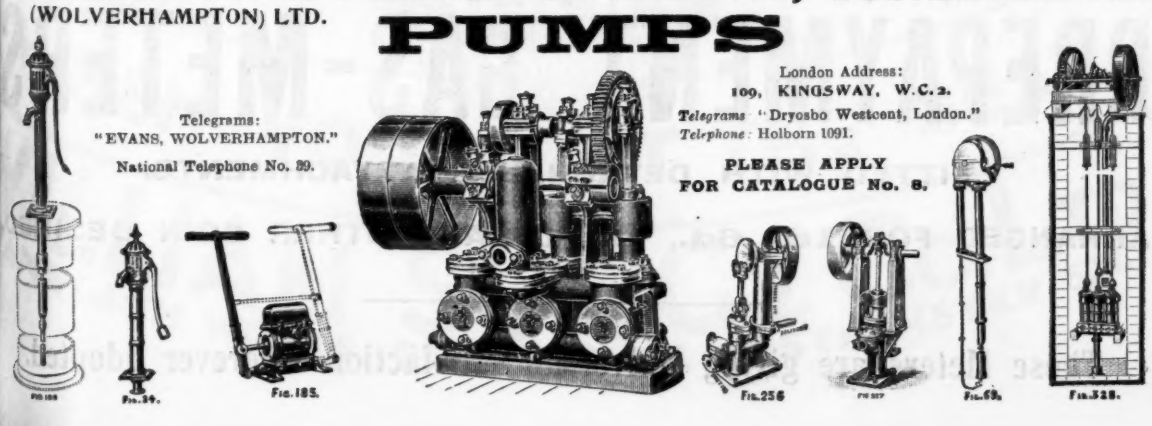

Fig.39. Fig.185. Fig.256 Fig.63. Fig.328.

Are there any

TIN BOX MANUFACTURERS *in your area* ?

or WIRELESS BATTERY MAKERS
or TOBACCO MANUFACTURERS
or FOOD PRESERVING FIRMS

ALL these need soldering equipment. Your salesman can secure the business for Gas if he offers our High-pressure Soldering Irons, Soldering Stoves, or Solder Bath Burners, because there is nothing to equal them for efficiency. One Tobacco firm alone has had 600 of our irons! We have supplied thousands to Wireless Battery Makers! Large numbers of Soldering Stoves and Solder Bath Burners are used by Tin Box Manufacturers!

WHY not consider a special canvass of your district? In the meantime, write for our Catalogue G149.

(1) Straight pattern Soldering Iron with square copper bit and aluminium handle—new design.
(2) Hatchet pattern Soldering Iron with chisel shaped copper bit—any shape of bit supplied.

WHERE the use of our internally-heated soldering iron is not convenient, this "KB" Stove will be found the most economical means of heating the ordinary soldering bolt.

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Gas Equipment for Industrial Heating

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VERTICAL GAS RETORT SYNDICATE, LTD.

"SIMPLEX" Water Gas Plants.
Simple, Efficient, Low Cost and Maintenance.

"SYDENHAM" Grates.
Eliminate Clinkering. No Steam required.

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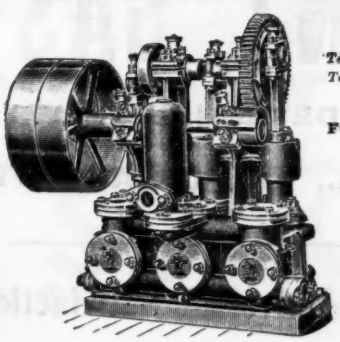

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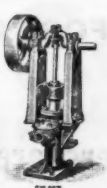

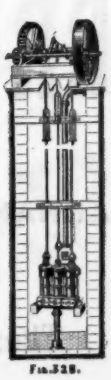

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If your Coke Stocks are low, instal a

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RECOVER ABOUT 40 % OF FIRST-CLASS FUEL FOR RETORT FURNACE USE.

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IMPROVED PATENT COIN

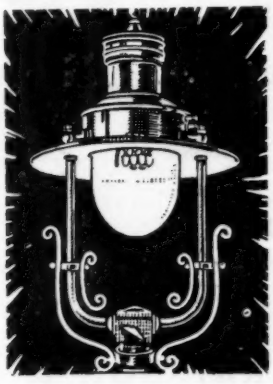
PREPAYMENT GAS-METERS

FITTED WITH DETACHABLE ATTACHMENTS.

ARRANGED FOR 1d., 6d., 1s., OR ANY OTHER COIN DESIRED.

These Meters are giving Universal Satisfaction wherever adopted.

FOR BETTER PUBLIC LIGHTING



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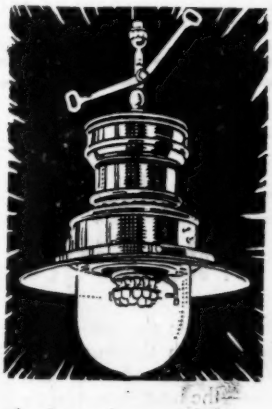
A LAMP OF DISTINCTION FOR PARADES, MAIN THOROUGHFARES, WIDE CROSSINGS & PUBLIC PARKS

More easily cleaned and maintained than a square lamp; readily lends itself to automatic systems of lighting, the auto device being concealed in the square base; may also be equipped with dual services so that lights may be reduced at midnight.

The 'ROCHESTER' Suspension Lamp

WIDELY USED ON TRAM STANDARDS AND IN SWAN NECKS ON EXISTING PILLARS—WIND & WEATHER PROOF

Rapidly growing in favour for Public Lighting, owing to its flexibility, freedom from shadows, ease of maintenance, greater reflection and generally pleasing appearance. May be used in groups on two, three, and four-way fitments, thus providing up to 6,000 c.p.—high-pressure candle power at low-pressure upkeep cost. Made in special storm-proof casing, easily fitted with auto-controller.



Consider the claims of these two really well-made lamps in connection with improved lighting schemes; remember that the credit of gas lighting can only be advanced by the use of properly constructed fittings. Our Public Lighting Catalogue is free on request.

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WILLIAM SUGG & CO. LTD

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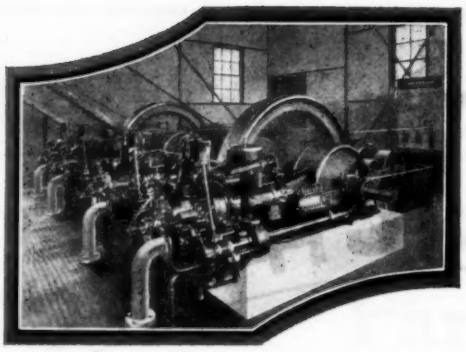

Two Double Cylinder Crossley Gas Engines driving 100 K.V.A. 50 period 220/380 volt alternators at the Wood-working Mills Padox at Warmond, Holland.

"Steam plant cannot compete with it"

The following letter refers to a 164 B.H.P. Crossley Gas Engine and Gas Producer.

From:—Rizerie Lee How Cheong,
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Dear Sirs,

Our mill has usually to run day and night and so time for cleaning and repairing is very scarce. Up to the present, our plant can keep running day and night continually, we stop the engine for cleaning purposes after it has been running for a month or over. In considering the result above mentioned it is perfectly a good plant; of course a steam plant cannot compete with it.—Yours faithfully,

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GAS & OIL ENGINES

Built in various sizes from 2 to 1000 b.h.p.

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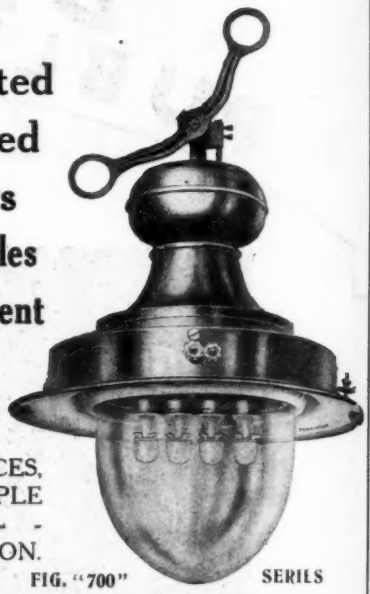
"PARKINSON" LAMPS

with Pre-Heated Metallised Burners and Mantles in Alignment



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W. PARKINSON & CO.,

INCORPORATED IN PARKINSON & COWAN (GAS METERS), LTD.,

BELL BARN ROAD, BIRMINGHAM.

COTTAGE LANE, CITY ROAD, LONDON, E.C. 1.

MORNINGTON STREET, BELFAST.

Consider it in this Light

"SERVICE to the consumer" *begins* with the installation of Welsbach Incandescent Gas Mantles—the most potent factor in the production of good lighting at a minimum cost. Careful selection and testing of the raw materials, and constant improvements during over 42 years' experience in manufacture have resulted in a product which is perfect in every detail.

WELSBACH

BRITISH MADE

GAS MANTLES

4

Advt. of The Welsbach Light Co., Ltd., 30-31, Farringdon Street, London, E.C.4. *Branches at Bristol, Birmingham, Edinburgh, Leeds, Manchester, Stoke-on-Trent, and Dublin.*

Meter repairing

Every meter sent to us irrespective of the make gets the same specialised attention to detail which has made "A. & M." New Meters famous.

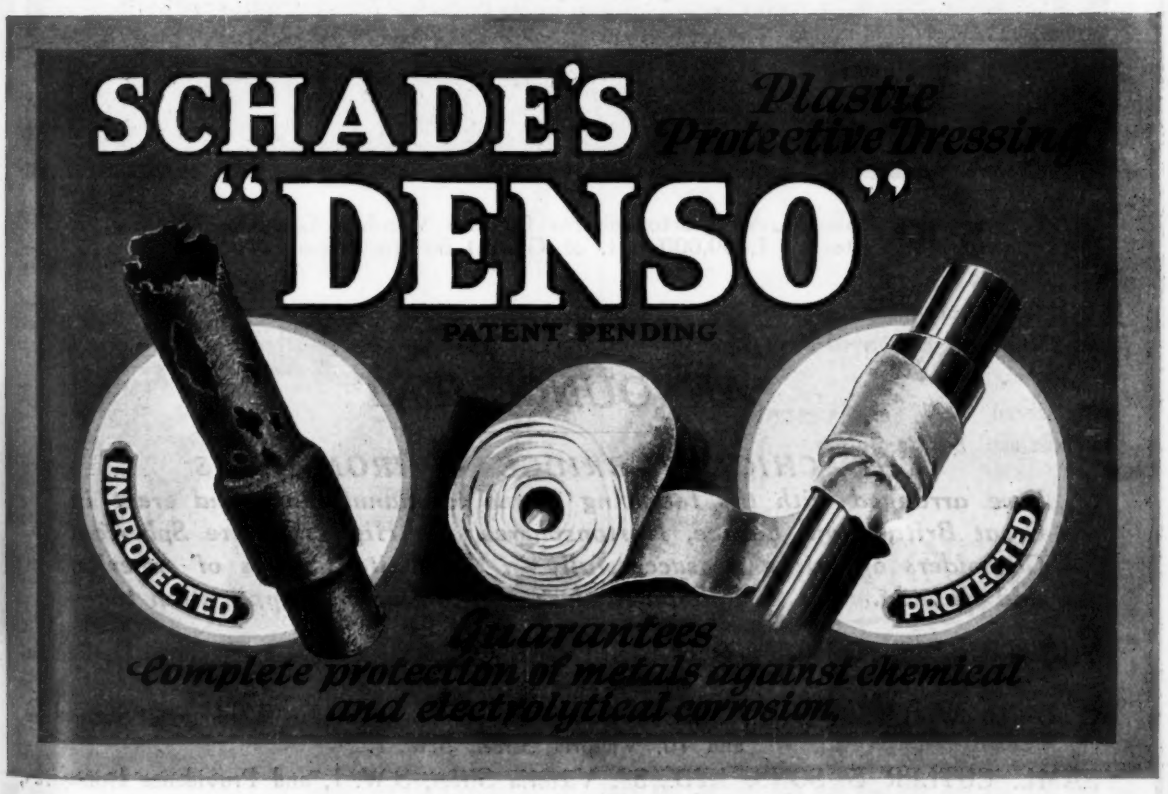
Each meter is carefully examined and if worthy is repaired, renewed, and returned in condition for many years of accurate service.

"A. & M." Quality is Proverbial

Alder & Mackay Ltd
Established 1850

Gas Meter Manufacturers.
EDINBURGH, LONDON, and BRANCHES.

SALES: 1928, 1½ million yards; 1929, over 4 million yards.



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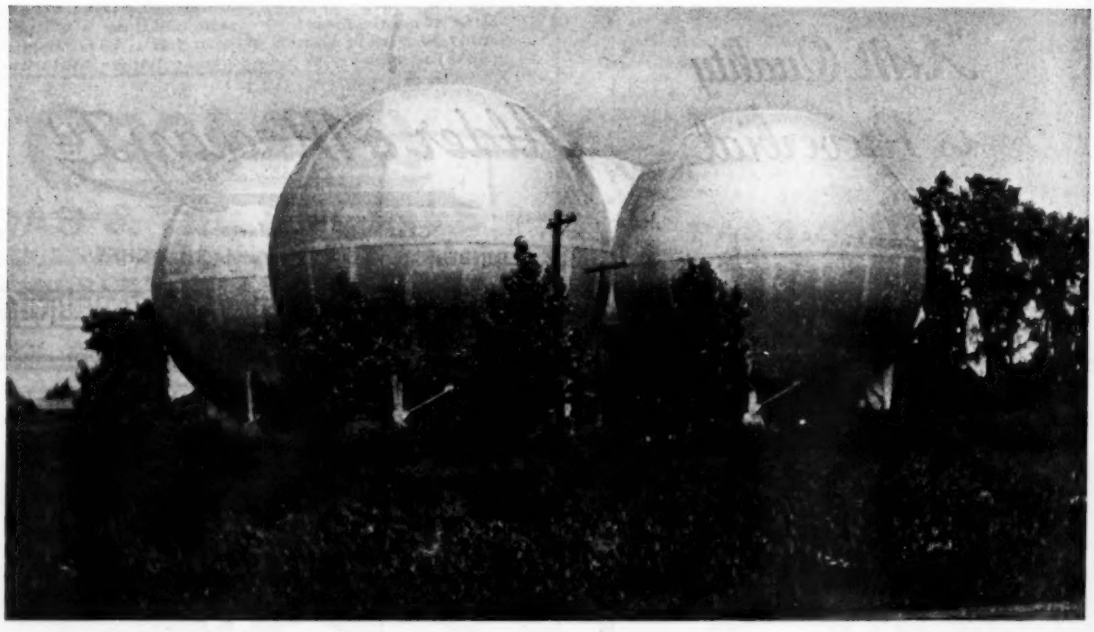
PAUL WINN & CO., Ltd., Oxford House, 15, JOHN ST., LONDON, E.C. 3.

HIGH PRESSURE SPHERICAL GASHOLDERS

"HORTONSPHERES"

The Solution of the Storage Problem



A recent installation of Hortonspheres for the Windsor Gas Co., Ontario, storing 1,000,000 c.ft. of Gas at 50 lbs. Pressure

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THE CHICAGO BRIDGE & IRONWORKS
have arranged with the following Firms to manufacture and erect in Great Britain and Europe, Hortonspheres, the High Pressure Spherical Gasholders operating so successfully in the United States of America and Canada. :: Full particulars gladly given on application to:—

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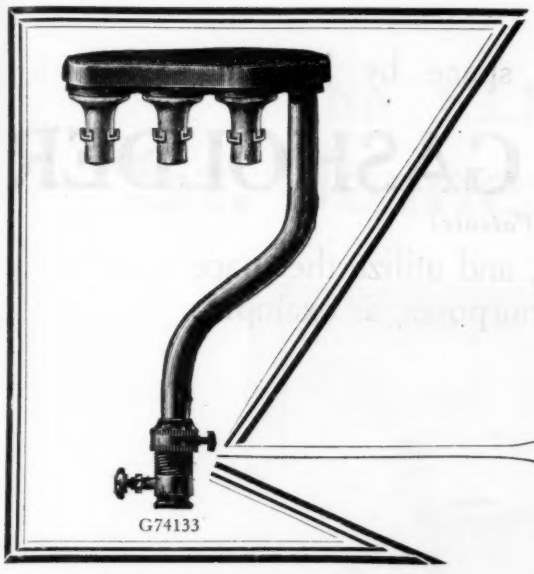
SAML. CUTLER & SONS, LTD., 39, Victoria Street, S.W. 1, and Providence Ironworks, Millwall, E. 14.



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EXPENSIVE GADGETS

TO COUNTERACT EFFECTS OF

VIBRATION ?

Try Our

VERITAS PATENT

GRADUAL ACTION

GAS ADJUSTER

Absolutely VIBRATION-PROOF

IN CONNECTION WITH OUR

NEW OBLONG CLUSTER

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Glasgow, Manchester, Birmingham, Dublin, Newcastle-on-Tyne, Cardiff.

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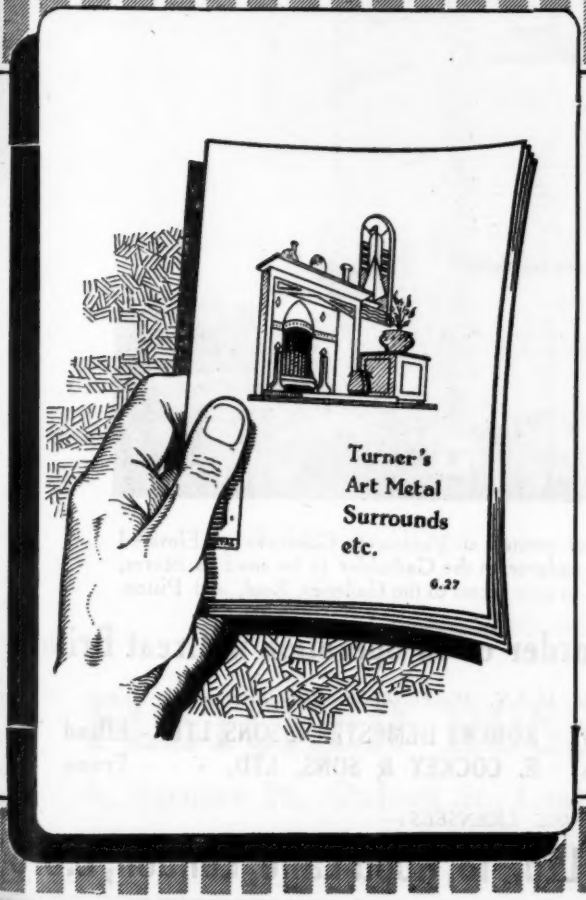

Turner's New Catalogue

for 1930 fully describes the whole range of latest designs in attractive Art-Metal Surrounds for Gas Fires.

Gas Undertakings are invited to write for supplies for distribution to their customers.

F. TURNER (ART-METAL) LIMITED

61, 62 & 63 Summer Hill St., BIRMINGHAM

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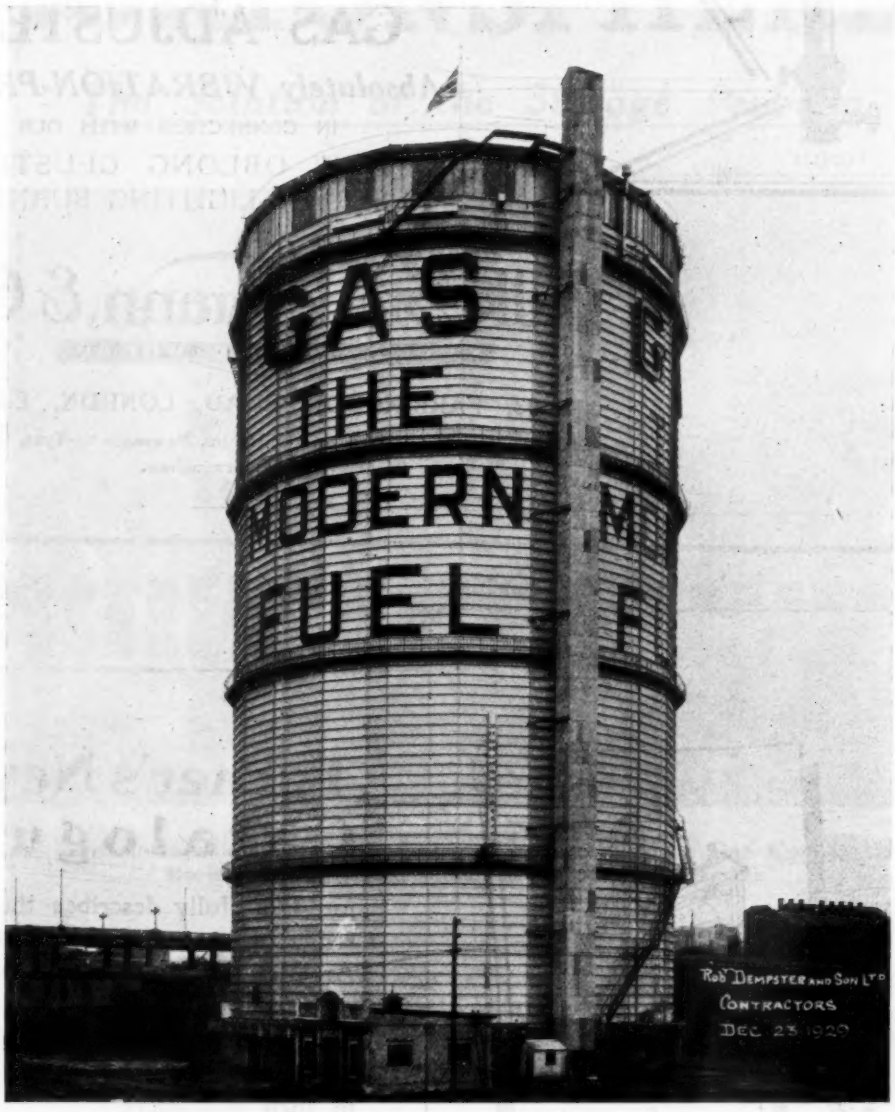
Economize your ground space by installing a

WATERLESS GASHOLDER

(M.A.N. Patents)

on Raised Foundations, and utilize the space underneath for storage purposes, as example:



3,000,000 c.ft. capacity Waterless Gasholder erected at Vancouver Gasworks on Elevated Foundations, allowing 12' 0" of headroom underneath the Gasholder to be used as Stores, complete with Electric Hoist 246' 6" high, to give access to the Galleries, Roof, and Piston.

22 WATERLESS HOLDERS on order or in operation in Great Britain

LICENSED CONTRACTORS FOR M.A.N. WATERLESS HOLDERS:—

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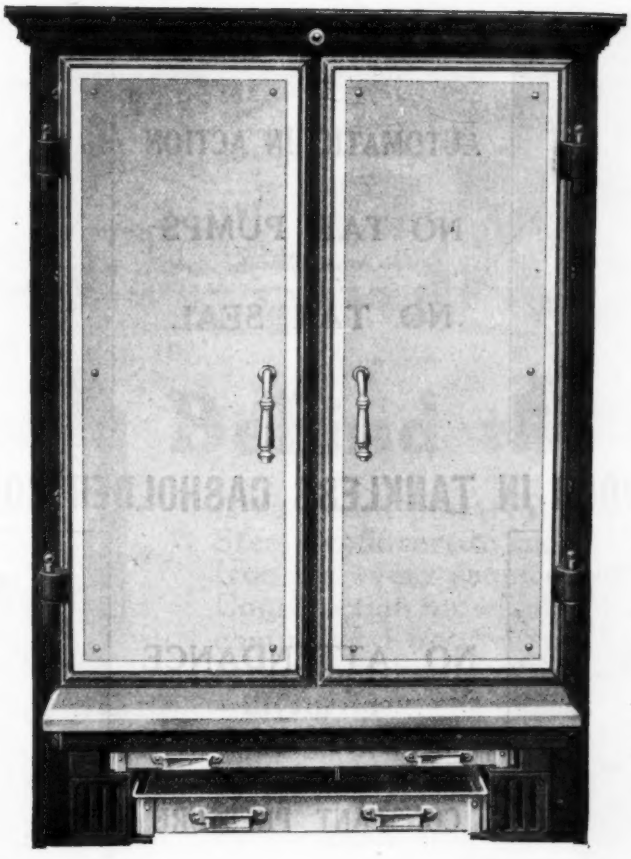
E. COCKEY & SONS, LTD. - - - Frome

BRITISH EMPIRE LICENSEES:—

WATERLESS GASHOLDER Co., Ltd., 13, Rood Lane, London, E.C.3

The FLETCHER "St. James'" Oven.



Suitable for HOTELS, CANTEENS & Large INSTITUTIONS.

Size overall 3 ft. 4 ins. wide by 3 ft. deep by 6 ft. high. Inside of Oven, 30 ins. wide by 32 ins. deep by 52 ins. high.

Constructed of heavy cast iron, with bright mouldings and White Porcelain Enamelled door and side panels. Double cased oven, packed, and fitted with enamelled steel linings. Four Grid Shelves and Drip and Gravy Pans complete. Burners are removable for cleaning, and are fitted with Gas and Air Adjusters.

Also supplied in Two larger sizes.

Full particulars on application.

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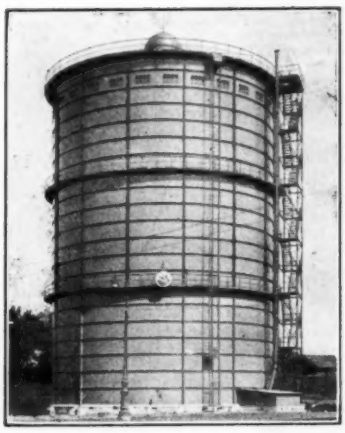
(Radiation Ltd., Proprietors.)

THE KLONNE SYSTEM OF TANKLESS GASHOLDERS.

(Fully patented in all countries.)

BRITISH CONSTRUCTION THROUGHOUT.

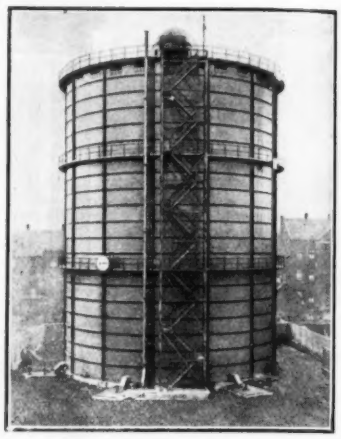
SIMPLE and RELIABLE.



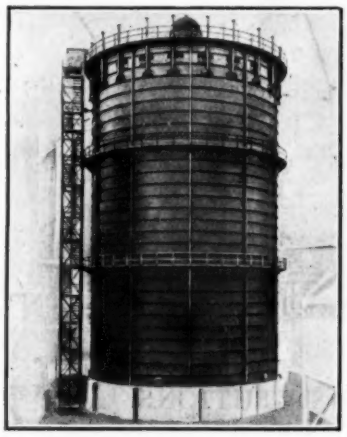
AUTOMATIC IN ACTION

NO TAR PUMPS

NO TAR SEAL



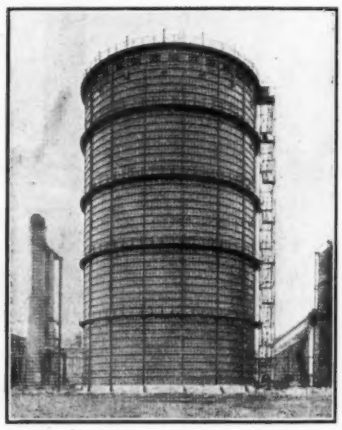
THE LAST WORD IN TANKLESS GASHOLDER CONSTRUCTION.



NO ATTENDANCE

DRY GAS

CONSTANT PRESSURE



8 Klonne Tankless Gasholders completed and working.

13 " " " under construction.

21 " " " ordered to date.

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THE PUREST IRON MADE
"ARMCO" INGOT IRON
WHICH
RESISTS CORROSION

PLATES
TUBE & PIPE
CONDUCTOR RAILS
WELDING RODS
DROP FORGINGS
SHEETS
BLACK C.R., C.A.
GALVANISED
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EXPANDED METAL LATH

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is ranged a powerful group of Iron and Steel Producers to supply "Armco" Ingot Iron for every requirement in Gasholder Construction for which none but the purest commercial iron, corrosion-resisting, uniform and durable to the highest degree will suffice.

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3 Gordon (Sydney) Gas Coy.
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9 United Gas Improvements Coy., Wistar.
10 Walton-on-the-Naze Gas Coy.
11 Waterford Gas Coy.
12 Weymouth Gas Coy., Etc., Etc.

The Armco International Corporation,

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Gas and Coke Oven Bye-Product Recovery Specialists :: ::

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Contractors for complete Gas Washing, Condensing and Bye-Product Plants

STATIC
WASHER-SCRUBBERS

A NEW DEPARTURE:—All the advantages of Tower Scrubbers, combined with those of Mechanical Washing Devices, are embodied in

The Wilton Static Washer-Scrubber

FOR

AMMONIA RECOVERY — REQUIRES NO FRESH WATER.

SCRUBBING COMPLETED WITH PREPARED VIRGIN LIQUOR.

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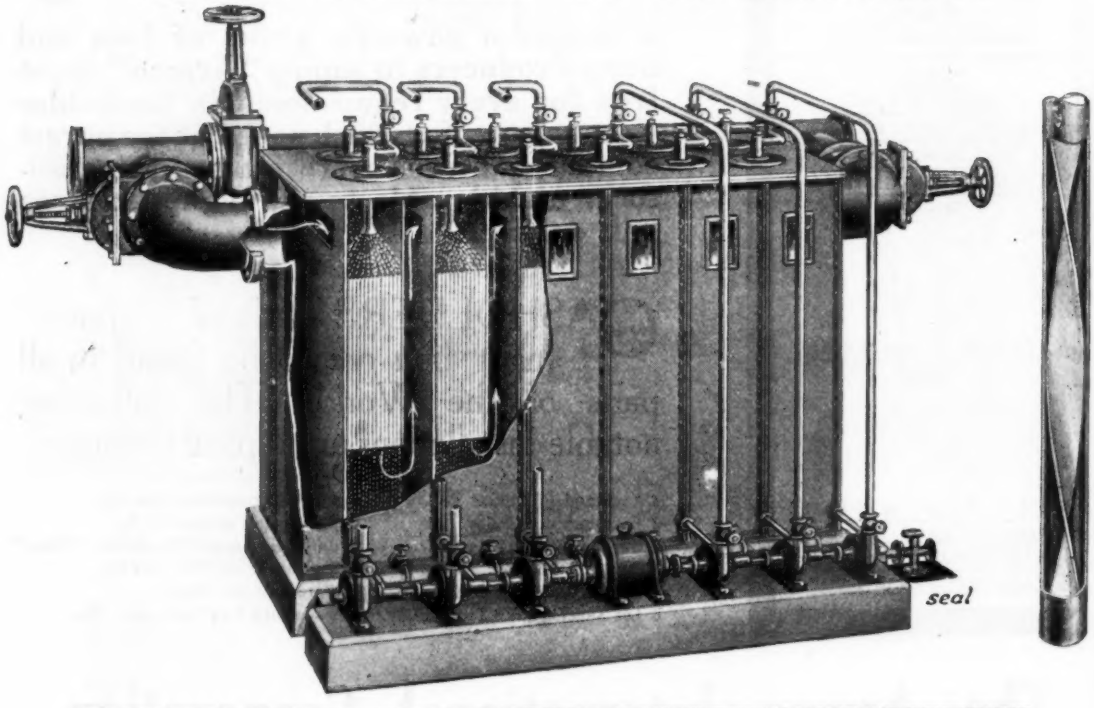

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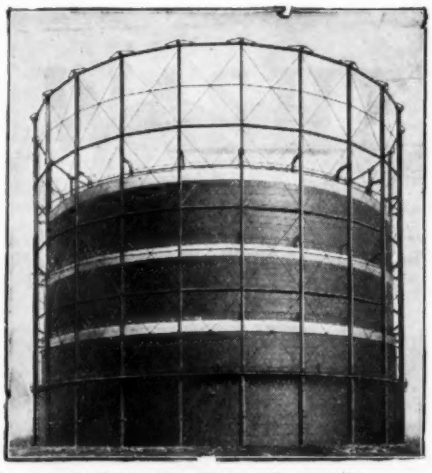

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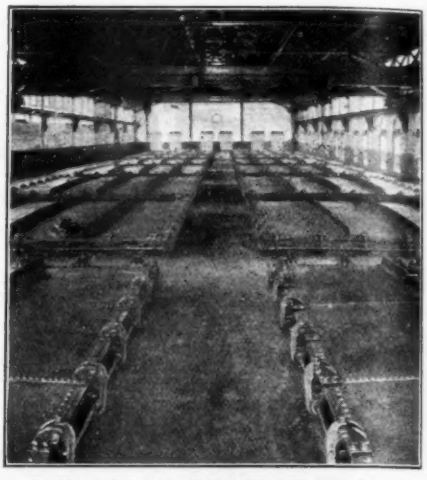

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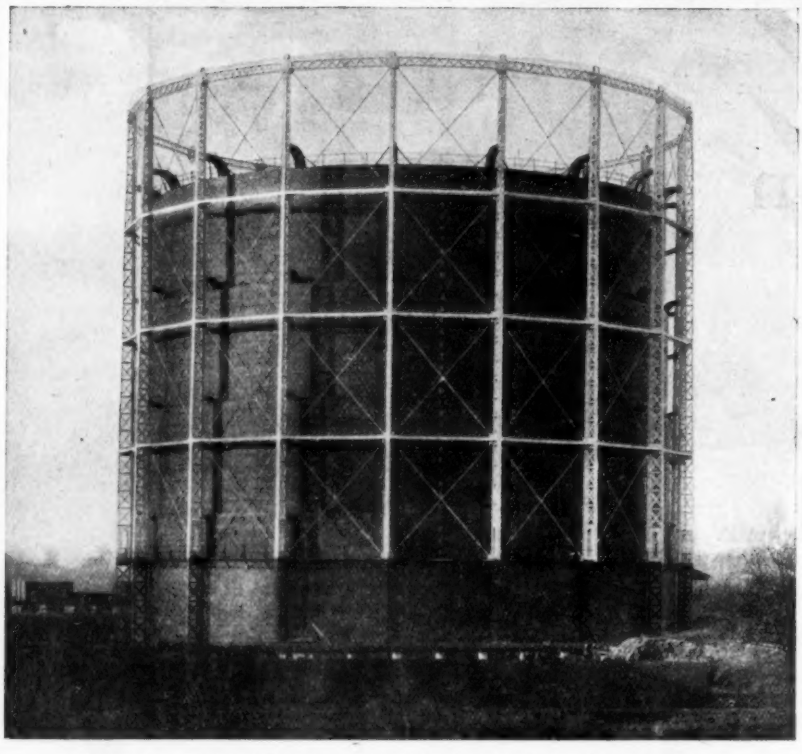

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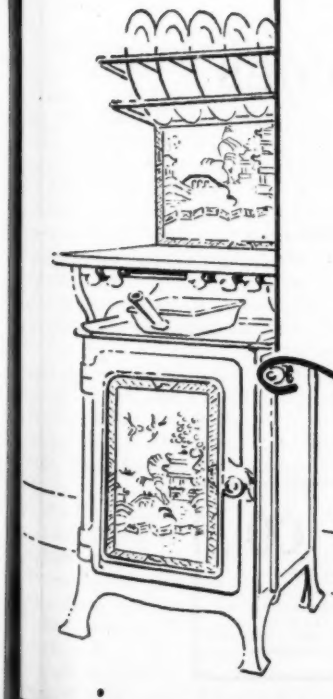

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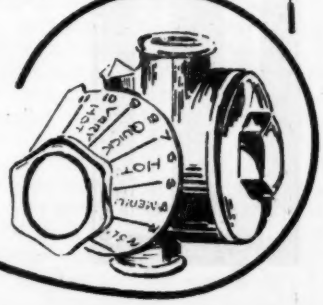

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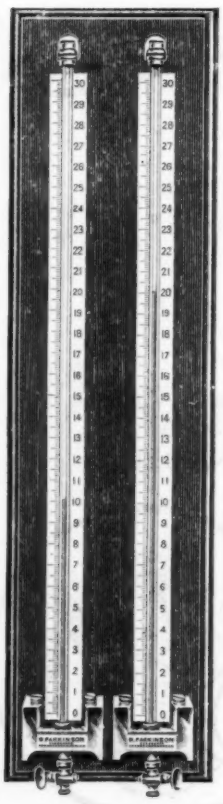

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VOL. CLXXXIX. No. 3485.] WEDNESDAY, MARCH 5, 1930. [82ND YEAR.

Editorial Notes.

Analysis of the London Companies' Accounts.

ELSEWHERE in this issue we are permitted to publish the analysis of the accounts of the principal London and Suburban Gas Companies for the past year, compiled by Mr. F. J. Bradfield, General Manager of the Commercial Gas Company. Nine companies are again included in the analysis, and the results appear to be uniformly satisfactory. With one exception there has been an expansion of the gas sales, the rate of increase varying from 2·67 p.ct. in the case of the Hornsey Company to 6·28 p.ct. in the case of the Croydon Company. This is a distinct improvement on the previous year, when the highest increase was 3·62 p.ct. recorded by the Lea Bridge Company. The exception referred to above is that of the Commercial Company, which shows a small reduction in the sales of 1·59 p.ct.

There have been some slight fluctuations in the gas made per ton of coal carbonized. The Lea Bridge Company again leads the way with 76·32 therms, and only one Company—Hornsey—is below the 70 therms mark at 69·51. It will be seen that the working results have been consistently good. The Commercial Company has for once lost its usual pride of place for coke made for sale to Tottenham and to Hornsey, which Companies respectively record a make of 11·12 cwt. and 10·92 cwt. per ton of coal. The Lea Bridge and Hornsey Companies again lead the way in the make of tar with 14·57 gallons and 13·80 gallons per ton of coal respectively; and the South Metropolitan with 40·98 gallons of liquor per ton of coal is again the highest.

Last year we drew attention to the general increase in the amount of capital expenditure. This year there have been some slight increases and some slight reductions, the greatest variation being a reduction of 0·78d. per therm by the South Metropolitan Company, due to the larger quantity of gas sold to the South Suburban Company. A low capital expenditure is usually, and quite rightly, regarded as a sign of strength; but it must not be overlooked that a low dividend and interest charge is a more reliable factor in this respect. Gas prices have been steady during the whole year. In fact, the only two changes made were by the Lea Bridge Company at Lady Day to 8½d. per therm and the Hornsey Company at Michaelmas to 7d., the latter being the lowest price in London. While it is incumbent on all gas managers to study the figures of other companies, and if desirable to try to emulate them, the one figure that counts is the price of gas. No matter what criticism may be directed at this or that item of expenditure or this or that working result, the company which sells at the lowest price is the one to which pride of place is given. In connection with the dividend charge mentioned above, it is significant that this charge of the Hornsey Company is lower than any other Company at 1·24d. per therm.

Comparing the revenue accounts of the various Companies, the costs per therm sold show that coals, oil, &c., are in all cases slightly lower than for the previous year, the Hornsey Company being the highest at 4·49d., and the South Metropolitan the lowest at 3·14d. The Commercial Company again leads the way with residuals with 2·59d., Lea Bridge being the lowest at 1·58d. For net coals, oil, &c., the South Metropolitan Company was the lowest at 1·11d., and Lea Bridge the highest at 2·54d. Dealing with the principal items of the remaining expenditure, the cost of repairs and renewals of plant varied between Tottenham at 2·11d. and 0·94d. in the case of the Hornsey Company. Mains and services cost most at 1·30d. at Tottenham, and least at 0·54d. in the case of the Commercial Company. District costs under the headings of meters and stoves vary considerably, the highest for the two items being 1·72d. Commercial and the lowest 0·60d. Hornsey. Co-partnership, pension funds, national insurance, &c., when combined, show some large differences. The cost to the South Metropolitan and Wandsworth Companies was 0·62d., and to the Lea Bridge Company 0·25d. only. Total expenditure, less residuals, showed less variation than in the previous year. The Tottenham Company was the highest at 9·07d., and Hornsey the lowest at 7·18d. Gas receipts, with the exception of Tottenham, were uniformly lower than for 1928. Croydon received an average of 9·10d., the South Suburban Company coming next with an average of 8·88d., and the lowest being Hornsey at 7·31d. Rentals, as usual, show rather large variations, from 2·02d. for the Tottenham Company to 1·05d. for Hornsey. The balance of profit throughout all the Companies is satisfactory. Croydon shows the highest figure at 2·60d., and Hornsey comes last at 1·22d. Dividend and interest are fairly uniform, and the same two Companies occupy the first and last positions

The sundry figures at the bottom of the analysis are perhaps some of the most interesting. There is a large variation in the cost of coal per ton, Lea Bridge paying the most at 28s. 9·57d., and the South Metropolitan the least at 19s. 0·10d. Croydon has the pride of place in the amount realized for each ton of coke, at 23s. 1·05d.; and the Wandsworth Company comes last, at 18s. 5·69d. per ton. It is, however, noteworthy that the South Metropolitan is the only Company which received a higher price per ton of coke than it paid per ton of coal. The Gas Light and Company received the highest average price per gallon of tar, and the Commercial the highest price per butt of liquor. Net profit p.ct. on ordinary capital is a figure which shows the greatest extremes, ranging from 3·68 p.ct. in the case of the South Suburban to 11·84 p.ct. in that of the Croydon Company. Finally, of the Companies making water gas the highest percentage was 37·20 by Lea Bridge, and the lowest 1·61 by the Commercial Company.

"Safety First" in Practice.

During the year 1920, 236,000 million c.ft. of gas was sold to 7½ million consumers; in 1928, 283,000 million c.ft. was supplied to 9 million consumers. The numbers of accidental deaths ascribed to coal gas poisoning in Great Britain in these two years were 114 and 168 respectively; and there can be no doubt that these figures are on the high side, as the "accidents" include deaths which may have been suicidal, the evidence at the inquests not sufficing to decide this point. The number of such doubtful cases tends to vary in proportion to the increase shown in recorded suicides, which in 1920 amounted to 413, compared with 1359 in 1928; hence the inference that fatal gas accidents, far from having increased per thousand consumers, have decreased.

The foregoing figures are from the report of the Departmental Committee on Gas Poisoning, which was published a fortnight ago, at which time we suggested that the findings of the Committee afforded recognition of the "service first" principles which characterize the internal organization of our industry. No better example of these principles could be cited than the standard practice of the South Metropolitan Gas Company in the matter of the design, construction, standardization, and testing of gas mains, services, meters, piping, fittings, and gas appliances. No practical procedure could be more stringent in its requirements, more free from error, or more calculated to ensure immunity from risk in the use of gas. Also, no work of this nature could be more fittingly described than is done in an illustrated booklet which the Company issued last week.

The idea of the booklet is to explain what the Company are doing to secure "the efficient, economic, hygienic, and safe distribution of town gas." It commences with a section on mains and mainlaying, giving the specification for turned and bored cast-iron pipes, and the method of jointing these and also steel tube; and it passes on to review the tests which are carried out on service pipes, internal services, cocks and unions, meters, fittings, cooking stoves, fires, hot-water circulators, and geysers.

Our readers know sufficient about the "South Met." to appreciate that the care and efficiency exercised in their retort houses are extended in like manner to consumers' premises. They will find this booklet most interesting; and we feel sure that the man in the street, who is naturally uninterested in "therms per ton," and so on, will regard it as both fascinating and reassuring reading. Such a compilation is definitely in the interest of the gas industry as a whole.

The Tax on British Coal Consumers.

Last week saw the quota system definitely embodied in the Coal Bill by the House of Commons, by so narrow a majority of votes, and after such bargaining and negotiating between parties, as to give its endorsement the final stamp of political expediency rather than of economic justification. The objections to the system have been so widely stressed that there is no need to go into details on this occasion. The only likely gainers from the scheme, if it really ever reaches, through its highly complicated machinery, a workable stage, will be the foreign consumers of British coal, who are to be subsidized by the tax or levy on home consumers. The only other complacent party is the Government, who are relying upon the marketing schemes, based on quotas, as a cloak beneath which to introduce the economically unjustifiable reduction in miners' working hours, and the parties to the old Five Counties Scheme, whose troubles have been largely due to the fact that they were playing a lone hand in output restriction, and so finding it difficult to make their home markets subsidize their exports.

The miners may or may not be enthusiastic at the present time for the Bill. They have always been told they want shorter working hours, but what they really desire to receive is higher wages, and, more important still, higher earnings. In this respect, we foresee some bitter disappointments under the short-time working which quotas necessarily imply.

The Federation of British Industries, the Association of British Chambers of Commerce, and many other bodies of thinking business men throughout the land have formally recorded their protests against the Bill. From our own industry, the leaders have condemned it in clear and irrefutable terms. But, all along, the coalowners have been generally regarded as the villains of the piece, in league with the Government in their own interests, though on several occasions in these columns we have given our opinion that, as a whole, they were having the villain's part rather forced upon them. This view is borne out by a statement issued last week, to the effect that, as some misapprehension has been felt to exist with regard to the views held in the coal industry on the Coal Mines Bill, the following resolution had been passed at a joint meeting of the Mining Association and the Central Coal Marketing Committee: "The following districts—"Scotland, Northumberland, Durham, South Wales, "South Staffordshire, part of Warwickshire, Shropshire, "Somerset, Bristol, Kent, Cumberland, and Flintshire, "representing a majority of the output of coal in Great "Britain—record their opposition to the Coal Mines "Bill as a whole, which, if passed into law, will cause "permanent injury to those engaged in the coal industry, "and particularly to the workers." After the meeting it was semi-officially stated that "there was no difference "of view whatever with respect to the disastrous character "of the compulsory amalgamation proposals incorporated "in the Bill as a result of the political bargain between "the Government and a section of the Liberal party."

Hot Water Supply by Gas and Coke.

To-day we complete publication of the sections of Mr. A. H. Barker's report presented at the Joint Gas Conference in Birmingham dealing with the comparative costs of heating by coal, gas, and electricity, and of hot water supply by coke and gas. We commented last week on the author's conclusions in regard to heating, and our present remarks will be confined to hot water supply for domestic purposes. This section of the report emphasizes more than anything else that there is no one solution for domestic hot water problems; to say gas or coke is best, without qualification, is to say nothing of any value. In common with so many questions, everything depends on the conditions of use. If a plentiful and constant supply of hot water is the requirement, then, with current prices of gas and coke, the latter is the only reasonable fuel in normal circumstances. If, on the other hand, the hot-water demand is slight, gas is ideal.

Another important point is that the economics of hot-water supply by gas are largely governed by method of use. It is possible, with the same installation, to conserve gas or to consume it extravagantly. Moreover, if the gas bill proves unduly high, the fault is not always with the consumer. Our industry has not paid sufficient attention to the insulation of gas-heated systems. Lack of insulation may ruin an otherwise excellent installation, and it should undoubtedly be the aim of all gas undertakings to impress on their consumers the great value of gas appliance overcoats. In this connection, the following observation of Mr. Barker puts the matter in a nutshell: "In the case of a gas-heated hot-water supply, every foot "of uncovered pipe, (say) 1½ in. diameter, kept hot day "and night through a whole year costs the consumer about "7s. 6d. per annum [gas at 10d. a therm]." There is a further consideration in this regard—the proper use of thermostatic control. This, to our mind, is the best friend which gas ever had. Good insulation, and a thermostat operating with a water temperature of 140° Fahr., may transform gas extravagance into gas economy.

We call attention to one of the definite cost findings of the report under review. With an installation designed for heavy demand (as an indication of this demand, 45 baths a week), gas at 10d. a therm is three-and-a-quarter times as costly as coke at 40s. a ton, fuel costs alone considered. Mr. Barker did not experiment with electricity, but wisely confined himself to a calculation based on the "most favourable condition." With current at 1d. per unit, electricity would be nearly eight times as expensive as coke. As we have said, these costs are for a very heavy demand, for which gas at 10d. a therm is not, in ordinary circumstances, suitable. Where the use of hot water is

small and occasional, then, remarks Mr. Barker, "a locally fitted gas plant is certainly more economical than any other method," albeit he is not in love with the geyser *per se* . . . "to wait for it to fill a hot bath is an exasperating experience." We think that such exasperation is the result of comparison between a perfect circulating system and a geyser, and not, as it should be, between a geyser and a fire-back boiler, or between a geyser and complete absence of hot water. However, we now have available well-insulated, low-consumption, extremely-economical gas-heated storage units; and such a device, says Mr. Barker, "combined with local instantaneous gas heaters for a small house is ideal, both for cheapness of installation and for economy."

Monthly Accounts.

Thanks are extended to the correspondent who, under the pseudonym of "Rental Superintendent," discusses in the correspondence columns the question of monthly accounts, for it is an important matter, of which more will undoubtedly be heard as time passes. His suggestion that the editorial note in last week's number may have been dictated by enthusiasm is accepted as a compliment, but his remark that certain sentences quoted may be regarded by "the initiated" as "damning with faint praise" can hardly be taken as applicable to the article in the "Journal." These quoted sentences, which formed only part of the argument, were, as a matter of fact, as is obvious from the text, those of Dr. Charles Carpenter, President of the South Metropolitan Gas Company, and Chairman of the South Suburban Gas Company. Surely, one of "the initiated."

But the testimony of Dr. Carpenter does not stand alone. Last year, when the subject was being dealt with in the "Journal" columns, opportunity was taken to ascertain what had been the result of the monthly gas account system elsewhere—for though so new in Old England, it is comparatively old to New England—it is, indeed, believed that it has now become general practice in the United States. Mr. Burton Smart, the Treasurer of the Portland (Maine) Gas Light Company, was approached, and subsequently an article appeared in the "Journal" from which the following is abstracted, for the help of those who may not now have at hand the issue dated Sept. 4, 1929. It will be seen from this that all the meters of the Portland Gas Company, numbering some 15,000, are read monthly, on the same date each month, with the exception of about 100, *which are read weekly*.

So that we might learn something of this Company's views, we approached Mr. Burton Smart, the Treasurer, who, for the benefit of our great industry, has courteously forwarded some details of the experience of the undertaking in handling their bills monthly, which they have done for the last fifteen years or more. Under this system, all the meters of the Portland Gas Company (about 15,000), with the exception of those of some 100 weekly customers, are read monthly, on the same date each month. They are divided into twenty-four regular zones; and the work is done by three high-grade meter readers. Another reader has charge of the weekly customers, who are bakers, small hotels, restaurants, and a few other large users. Each man reads about 200 meters daily for 24 days every month, providing the clerical staff with 600 meter readings to bill each day and the same number of consumers paying their accounts. This makes every day's work alike. The deposits daily are about the same; and there is no night or Sunday labour. The bills are smaller in amount, and thus easier for the customers to pay, which is pleasing to them—especially if they are housekeeping on a monthly budget system, as is now quite a usual proceeding in New England.

The Company have, at the suggestion of the State Public Utility Commission, also done away with the discount hitherto allowed for prompt payment; and greatly to the surprise and pleasure of the officials, this retarded payments only for a few months, while it has removed innumerable petty disputes about forfeited discounts—making the relations between the Company and the consumers just so much more agreeable. The new system tends to bring the consumers much more often to the Company's offices (a part of which is the appliance display and sales rooms); and business is thereby increased. The percentage of loss, too, is now less annually than before. Finally, there is avoided the confusion which used to arise at certain periods through overlapping of work.

In the above extract it is pointed out—by Mr. Burton Smart, one of "the initiated," not by the "Journal"—that "the bills are smaller in amount, and thus easier "for the customers to pay, which is pleasing to them—"especially if they are housekeeping on a monthly budget "system, as is now quite a usual proceeding in New "England." This is precisely the consideration which led the "Journal" to refer to the matter in the first instance—before, in fact, particulars were available of the move in this direction of the South Metropolitan Gas Company. Monthly accounts are a step in conformity with modern conditions.

Directors' Resignations.

Last October, when referring to the financial shocks which were at that time afflicting the City, the suggestion was made that, *inter alia*, "the immediate intimation by post to every shareholder of changes in personnel of the Board is no more than partners in a business may fairly lay claim to." This subject was referred to by Mr. F. D. Head, in Monday's "Financial Times," when he pointed out that, "as the law stands at present, the Secretary notifies Somerset House of any resignation from the Board, but no public announcement is necessary, and, in fact, publicity might in many cases damage the company. On the other hand, no communication of any kind is made to the shareholders, who may remain in ignorance of the state of affairs until the next general meeting. They learn then that an influential Director, who influenced their subscriptions, resigned, perhaps, shortly after allotment." The suggestion put forward by Mr. Head is that the present filing of particulars of resignations should be supplemented by private notice to the shareholders, who could then exercise their right to convene a meeting. Alternatively, resignations should only be effective to a general meeting.

A Harmless Tar.

At the annual meeting of the National Association of Fishery Boards, Mr. H. G. Maurice, the Fisheries Secretary at the Ministry of Agriculture and Fisheries, explained that the Ministry had for some time been in negotiation with the British Road Tar Association, who had now produced a sample of "harmless tar;" and the Ministry were endeavouring to arrange an experiment on a road scale this summer.

Engineering Problems in Gas-Works Plant.

Some illustrations and extracts are included in this week's "Journal" from a paper read before the Manchester Association of Engineers by Mr. J. W. Curtis, of West's Gas Improvement Company. The part of the paper which we have selected contains, it will be seen, instructive examples of erection. The object of the author was to show the engineering profession generally that there are many interesting engineering problems in the design and construction of gas-works plant, and that these problems call for considerable ingenuity and engineering skill and acumen. Incidentally, Mr. Curtis took the opportunity of impressing upon his hearers the magnitude and growth of the industry.

Gas in Italy.

Included in the "Morning Post" for Monday last was a section on Italy, in which reference was made to the gas industry. Until recent years, it was stated, the gas industry in Italy was practically limited to the production of gas and coke in the larger towns; but, owing to the impetus given to it by the formation of the "Italgas" group and the resultant powerful "Italgas" organization, it only awaits its hour to become one of the wealthiest industrial concerns in the world. The "Italgas" concern controls nine gas companies, having between them a total capital of 500,000,000 lire. They produce and distribute gas and coke throughout Italy. Some idea of the importance of this combination can be gathered from the following extract from the figures for 1929: Gas produced, 345 million cub.m.; coal distilled, 814,000 tons; coke produced, 600,000 tons. The "Italgas" also controls all the coal-tar distilleries which form the "C.L.E.D.C.A." Company. These have a capital of 21,000,000 lire, and deal with the supply of coal derivatives and basic products for the chemical industry in Rome, Naples, Milan, Turin, Mestri, Vado Novi, and Fidenza.

In To-Day's "Journal."

Fuel Research Board Reports.

The following report is reviewed: "Report of Test by the Director of Fuel Research on the Turner Retort installed at the Works of the Comac Oil Company, Ltd., Coalburn, Lanarkshire."

* * * *

Engineering in the Gas Industry.

Photographs are given of several interesting engineering structures in connection with gas manufacture. They are from a paper which Mr. John W. Curtis, M.B.E., a member of the staff of Messrs. West's Gas Improvement Company, Ltd., read on Feb. 28 before the Manchester Association of Engineers.

* * * *

The Thermometer and the Heating Load.

A chart shows the effect of temperature on the output of gas by the Hastings and St. Leonards Gas Company. It is a comparison between the sales in January, 1929, with those for the corresponding month this year. Last January's reduction in consumption is about 11 p.ct., and it is the more significant because the price of gas now is 10d., as against 10½d. in the January of 1929, and there are now more consumers and more heating appliances in use. For this striking diagram, which clearly shows the relationship between temperature and the gas heating load, we are indebted to Mr. Chas. F. Botley, Engineer and Manager of the Hastings and St. Leonards Gas Company.

* * * *

Gas and Coke for Water Heating.

Publication is continued of the comprehensive report by Mr. A. H. Barker, on the comparative costs of fuel for domestic purposes, which he presented at the Joint Gas Conference in Birmingham on Feb. 19. For the most part, it deals with gas and coke for water heating. One of the definite cost findings is as follows: With an installation designed for heavy demand gas at 10d. a therm is three-and-a-quarter times as costly as coke at 40s. a ton, fuel costs alone considered. Mr. Barker did not experiment with electricity, but confined himself to a calculation based on the "most favourable condition." With current at 1d. per unit, electricity would be nearly eight times as expensive as coke. Where the use of hot water is small and occasional, then, remarks Mr. Barker, "a locally fitted gas plant is certainly more economical than any other method."

* * * *

Mr. Bradfield's Comparative Results.

The statement, compiled by Mr. F. J. Bradfield, showing the comparative working results of the three Metropolitan and six of the Suburban Gas Companies, and the revenue account costs per therm sold, for the year 1929, is published.

* * * *

S.M.G.C. Railway.

There is an account of the private railway of the South Metropolitan Gas Company. There are now twenty-two locomotives in service, and a regular time-table is adhered to. Express trains deal with the discharge of coal, and the loading of coke at the docks for export to the Continent. There are more than twenty miles of railway track connecting the various depôts of the Company. Over a hundred men are employed on work in connection with the railroad, including engine-drivers, firemen, signalmen, guards, checkers, donkeymen, &c. There are five main signal boxes, and, owing to the large number of branch lines, an intricate system of signals is maintained.

* * * *

High-Pressure Distribution of Gas.

This subject is dealt with by Mr. F. W. Sansom, of Exeter; and Mr. C. E. Holt, of the Birmingham Gas Department, discusses the boosting of pressures for outlying districts.

* * * *

Results of Provincial Gas Companies.

The results of the Provincial Gas Companies, publication of which is continued in this issue, make gratifying reading. Most concerns show substantial increases in sales.

Forthcoming Engagements.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

March 11.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board.

March 12.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Visit to Fulham Stove Works of the Gas Light and Coke Company.

March 13.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting in the Council House, Birmingham. Paper by Mr. S. K. Hawthorn on "Oxide Purification."

March 15.—MIDLAND JUNIOR GAS ASSOCIATION.—Visit to the works of Messrs. Bryan Donkin Co., Ltd., Chesterfield.

March 15.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.—Meeting in Cardiff. Mr. T. H. Madden on "Mechanical Handling of Coke."

March 19.—BRITISH COMMERCIAL GAS ASSOCIATION.—Executive Committee, London.

March 20.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual Meeting of Members in the Midlands, Grand Hotel, Birmingham.

March 20.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual meeting of members in the Southern District, at 28, Grosvenor Gardens, S.W. 1, 2.15 p.m.

March 21.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute. Paper by Dr. H. T. Angus, Ph.D., M.Sc., on "Gas Cooker Oven Ventilation and Hotplate Burner Efficiency."

March 22.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Joint visit with Yorkshire Junior Gas Association to Messrs. West's Gas Improvement Co., Ltd., and City Justices Meter Testing Station, Manchester.

March 22.—YORKSHIRE JUNIOR GAS ASSOCIATION.—See Manchester Junior Association.

March 22.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to Bussey Coal Distillation Co., Ltd., Glenboig.

March 25.—MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.—Diamond Jubilee and Annual Meeting, Midland Hotel, Manchester.

March 28.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Annual General Meeting at the Hotel Cecil, Strand, W.C. 2, 2.15 p.m.

April 11.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Spring meeting at Helensburgh.

May 2.—NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.—Annual General Meeting in Newcastle.

May 16.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual General Meeting, Hotel Metropole, W.C. 1. Annual dinner in the evening.

June 2-5.—INSTITUTION OF GAS ENGINEERS.—Annual Conference in Leeds.

Personal.

Mr. T. BROWN, General Manager and Secretary of the Matlock and District Gas Company, has been elected Chairman of the Hathersage and District Gas Company, Ltd. Mr. Brown was the prime mover in the formation of the Hathersage Gas Company in 1905-6, and has never been absent from the Board meetings since the inception of the Company, except one meeting when the business of another Company claimed his attention.

Mr. CYRIL G. DAVIS has been elected Captain of the Newspaper and Advertisers' Golfing Society, the position previously held by Lord Riddell.

Mr. H. B. KENDRICK commenced his duties as Engineer and Manager of the Conway (North Wales) Gas-Works on Monday of this week.

Obituary.

The death of Mr. JOHN DAVIE, Chief Commercial Assistant, Edinburgh Corporation Gas Department, occurred with tragic suddenness on Feb. 22. He collapsed while watching the Rugby International at Murrayfield, Edinburgh. Mr. Davie was 60 years of age.

Correspondence.

[We are not responsible for opinions expressed by Correspondents.]

Lincoln Gas Engineer and Manager.

SIR,—Reference has been made in the columns of the Press to the inadequate salary which was offered by the Lincoln Corporation for the appointment of a Gas Engineer and Manager to its Gas Undertaking.

Immediately this appointment was advertised, the Executive Committee of my Council instructed me to make strong representations to the Lincoln Corporation, but, in order not to prejudice the consideration of such representations, no official announcement was made by the Institution as to the action which it had taken.

I am now informed, however, that the appointment has been made at the salary advertised, the Council of the Corporation feeling "justified in the salary offered."

In these circumstances, and having in mind the importance of the matter to all Chartered Gas Engineers, I enclose the correspondence which I have had with the Town Clerk. It sets out the facts and indicates the attitude of the Lincoln Corporation and the position of the Institution of Gas Engineers, which will consider taking more drastic action if a repetition of this state of affairs occurs elsewhere.

I am not aware of the name of the gentleman who has been appointed, and I need hardly assure you that no reflection of any kind whatever is intended upon him. He has the good wishes of every Chartered Gas Engineer in his task, and we can only hope that his work will result in such prosperity for the Lincoln Gas Department, that the Corporation will see fit to rectify the shortsighted action which it has taken.

J. R. W. ALEXANDER,
Secretary, Institution of Gas Engineers.

28, *Grosvenor Gardens, Westminster, S.W.* 1,
Feb. 28, 1930.

The following is the correspondence to which reference is made.

FROM LONDON TO LINCOLN, JAN. 21.

My attention has been drawn to the advertisement of the Lincoln Corporation for a Gas Engineer and Manager, at a commencing salary of £550 per annum, and the matter has been considered by the Executive Committee of my Council.

I am instructed to inform you that it is the considered opinion of this Institution that the salary in question is an inadequate one to offer for a Chartered Gas Engineer, with the experience necessary for the proper discharge of the work involved by a Gas Department of the standard which befits the City of Lincoln.

I understand that your Consulting Engineer recommended the payment of a salary substantially in excess of that now offered, and that the other Chief Officers of the Corporation receive higher salaries than the one proposed for the Gas Engineer and Manager.

I fully appreciate that the question is entirely one for your Corporation, and I know that the matter will have been carefully considered by your Council and that they have fixed the remuneration at a level which they consider adequate. I venture, however, to express the hope that you will invite them to reconsider the matter, not merely in the interests of the Profession which I represent, but in the interests of the Corporation itself and the Gas Department, since it is certain that a properly experienced and fully qualified Chartered Gas Engineer suitable for Lincoln cannot be secured at the present salary.

I feel sure that your Council will appreciate the reasons for my writing thus frankly. I am in a further difficulty, because potential applicants and others will apply for guidance in this matter, and I do not desire to have to inform them that the post, at the present salary, is one which has not the approval of this Institution.

I should be pleased to give you any further information you might require and to assist the Corporation in any way. I repeat my assurance that I write in what I consider to be the best interests of the gas consumers and the Gas Department of Lincoln, and I trust, therefore, that your Council will be good enough to reconsider the salary which attaches to this important and responsible appointment.

J. R. W. ALEXANDER.

FROM LINCOLN TO LONDON, JAN. 22.

I beg to acknowledge the receipt of your letter of the 21st inst. conveying the considered opinion of your Institution that the salary offered for the above appointment is inadequate for the proper discharge of the technical and administrative duties of Chief of a department of the importance of my Corporation's Gas Undertaking.

As you are probably aware, Mr. W. Doig Gibb has acted as Consulting Engineer to my Corporation during the past few years, but in view of the proposed salary he has tendered his resignation at an awkward moment for the Corporation, and such resignation was accepted by my Gas-Works Committee at their meeting on the 20th inst., and the position arising in consequence thereof was referred to the Council in Committee. Mr. Gibb was not consulted by the Council as to the salary which should be offered. I sounded him on the question unofficially, and subsequently obtained information from the municipal undertakings with an annual make of gas more or less equivalent to ours as to the salaries paid to their engineers and managers, which range from £700 to £1000 per annum. The Council had a schedule of these salaries before them when considering the salary to be offered, but they felt that they must have regard to the fact that, owing to the serious unemployment which has prevailed in Lincoln since 1921, some 2000 men are still out of work, and practically the whole of the manufacturing and commercial community had had to suffer considerable diminution of salaries and earnings. My Committee feel justified in the salary proposed, as numerous applications for particulars of the appointment have been received from the managers of the smaller municipal and company undertakings, or the assistant managers of the larger undertakings throughout England, Scotland, and Ireland.

I may say that the Council have been advised that an experienced and qualified engineer suitable for their undertaking cannot be obtained at the salary proposed, but they take the opposite view; and having regard to the applications which it is anticipated will be received, it will be difficult to persuade them to alter their decision.

I will, however, read your letter to the Council when they meet in Committee, and if your Institution would like to send a responsible representative to urge their point of view I will endeavour to secure his reception.

L. O. NEED,
Town Clerk.

Guildhall,
Lincoln.

FROM LONDON TO LINCOLN, JAN. 23.

I thank you for the courtesy of your letter of Jan. 22, and I am indebted to you for the prompt and kind attention you gave to my communication of the previous day.

I can appreciate only too well the industrial and unemployment difficulties which Lincoln has had to face since 1921, and I can assure you that my Institution would hesitate to say anything which might add to the task which the Corporation has to face in dealing with the situation.

I venture to suggest, however, that the salaries of Public Officials are never calculated, in times either of prosperity or of adversity, on a commercial basis, and, even if they were, there has not been, in the case of the Lincoln Corporation, a general reduction in salaries which would justify reduced remuneration for the Gas Engineer and Manager.

The Institution of Gas Engineers is anxious in this matter not merely because it wishes to maintain a proper standard of remuneration for Chartered Gas Engineers, but because it desires to do what it can to ensure the progress and prosperity of every gas undertaking throughout the country. Experience has shown that the best means of achieving this is to secure the appointment of well-qualified and experienced men.

I am obliged to you for your kindness in undertaking to read the correspondence to your Council in Committee, and if they would care to hear a representative from this Institution, I should be happy to consider the matter, for which purpose perhaps you would be good enough to let me know, at the earliest opportunity, the date of the meeting.

J. R. W. ALEXANDER.

JAN. 28.

Further to my letters of the 21st and 23rd of this month, I have to inform you that the Manchester District Institution of Gas Engineers has passed, without any direct or indirect encouragement from me, the following resolution, which, you will appreciate, supports my recent submissions as to the concern which has been aroused among Chartered Gas Engineers, in the matter of the salary offered for a Gas Engineer and Manager at Lincoln:

> That this Committee is of opinion the salary offered by the Lincoln Corporation for the position of Gas Engineer and Manager is inadequate remuneration for the services of an Official qualified to take charge of the Gas Undertaking, and must ultimately tend to discourage the Official appointed, resulting in inefficiency to the detriment of the Undertaking, and also—that a letter be sent to the Secretary of the Chartered Institution of Gas Engineers, requesting the Council to make immediate representations to the Lincoln Corporation drawing attention to the foregoing and quoting the salaries which are paid to qualified Gas Engineer by Undertakings of similar capacity.

I have been informed that several of our members have taken the initiative in refraining from supporting the applications of potential

candidates, and I anticipate that my Council will fully support the action of Mr. Doig Gibb in resigning his position as your Consulting Engineer, by way of protest in this matter.

I am interested to learn that you expect to receive a large number of applications for the appointment, but I feel sure your Council will appreciate that this does not indicate, in any way, that the salary is an adequate one, any more than those conducting "sweated trades" could maintain that the fact that they can easily obtain such labour, justifies their action or demonstrates that the wages are satisfactory—an analogy which I mention without any intention to give offence.

Another feature to which I might draw your attention is the report that the Assistant Electrical Engineer at Lincoln will be receiving a salary in excess of that given to the Gas Engineer and Manager, a state of affairs which, I assure you, the Electrical Engineers' Profession would be as anxious to set right, in comparable circumstances, as we are.

Since this is probably the last opportunity I shall have of writing to you before this matter is considered by your Council, please permit me again to emphasize that my Institution is regarding this matter, not merely from the professional aspect, but from the standpoint of the maintenance of a prosperous Gas Department at Lincoln. In order to achieve this, and, if possible, to adjust the question of salary, the facilities and resources of this Institution are entirely at the disposal of your Council, and, whatever the outcome, I need hardly say that such support will be in no way denied to the Engineer you think fit to appoint.

J. R. W. ALEXANDER.

FROM LINCOLN TO LONDON, JAN. 29.

I have received, and thank you for, your letter of the 28th instant.

I will read the whole of your correspondence to my Council in Committee when they meet to consider the matter early next month.

L. O. NEED,
Town Clerk.

FEB. 26.

'My Council in Committee met yesterday to interview selected candidates for the new appointment, and finally made the appointment. I submitted our correspondence to the Council, but they felt justified in the salary offered, and decided to take no action upon the representations made by you on behalf of your Institution.

L. O. NEED,
Town Clerk.

THE FINAL LETTER, FEB. 28.

I am obliged to you for your letter of the 26th of this month, and note that your Council feel "justified in the salary offered," and have made the necessary appointment.

While much regretting the action of your Council, I thank them for their consideration of the representations of this Institution, and I trust that your Gas Undertaking will meet with such prosperity that your Council will, before long, feel justified in placing the salary upon a satisfactory basis.

I propose to make the correspondence available for publication in the Press, and thank you for your personal courtesy.

J. R. W. ALEXANDER.

Complete Gasification.

SIR,—Mr. W. B. McLusky, of Halifax, in his reply to the discussion on his paper, "Residual Products and their Effect upon the Price of Gas," read before the Joint Conference, Birmingham, on Feb. 20, made the statement that "complete gasification would not pay; and if they were using coal, they had a hope some day that they would get as much for residuals as they paid for coal. If they had complete gasification, everything was gone." In the writer's opinion, a very good outlet indeed.

The question is, Are gas undertakings gas merchants or coke merchants? If gas, then why create a coke market in opposition to gas, which should be supplied at such a price to allow of its economical use? Probably the greatest anxiety of a gas manager is either his tar or his coke market. If there is not a slump in one, there is in the other. Why not cut them out?

Industry to-day wants gaseous fuel in millions upon millions of cubic feet per day, to enable it to cheapen production and capture not only the Empire market, but the foreign market as well. This enormous field for gas exists; and it is our national duty to develop it. We have collieries all over the Kingdom, with coal of varying qualities—good, bad, and indifferent—all of which can be gasified at the pithead, for the production of gas, tar, and ammonia products; and no plant will do this economically except a one-stage complete gasification plant.

The coal is delivered into the gas generating plant direct from the pit, and completely gasified, the clinker being automatically discharged from the bottom. The whole plant is mechanically operated and controlled, is run for fourteen days without a stop—and then stopped only for a few hours, for cleaning and inspection.

The resulting gas is of approximately 350 B.Th.U., and the quantity of gas, oil, and tar obtained will depend on the inert and volatile contents of the coal used. With such a process we have the solution to the problem of sending millions of pounds sterling abroad for the purchase of oil, which we have in the ground waiting to be mined and turned into money, keeping all the miners in the country employed.

This is Britain's natural gas supply, undeveloped and idle. Whereas the natural gas in America is petering out, ours is in existence in sufficient quantity to meet our requirements for industry for generations. This gas can be purified and delivered under pressure, and distributed all through the country, either by road or rail, compressed into cylinders at 150 atmospheres, or delivered into mains for the supply of receivers throughout the country for general use, or for motor traffic in place of petrol.

The market exists to-day for industrial gas in millions upon millions of cubic feet. This can only be manufactured by the complete gasification process; otherwise there would be an enormous over-production of coke. This is no dream or fairy tale, but a practical commercial proposition which will revolutionize the trade of the country, and enable us to fight the trade competition of the world.

C. B. TULLY.

70, *Victoria Street, Westminster, S.W.* 1,
March 1, 1930.

Circles for Gas Companies' Clerks.

SIR,—I have regarded with interest and pleasure the advancement and splendid business results of the Gas Salesmen's Circles, and I have often wondered if similar Circles for Gas Companies' Clerks would prove beneficial to their respective companies and to the gas industry as a whole. Comments respecting the formation of such Circles would, I feel sure, be welcomed with pleasure.

GEO. LEGGE,
Clerk.

Malton Gas Company,
March 3, 1930.

[We shall be glad to publish the views of our readers on this matter.—ED. "G.J."]

Monthly Accounts.

SIR,—I shall be grateful if you will permit the use of your columns for comment on your reference last week to "Monthly Accounts," which may have been dictated with enthusiasm, but suggests to the initiated a "damning with faint praise."

You say that this system "has fulfilled expectations, inasmuch as 'it has completely done away with that fruitful cause of grievance on the part of gas consumers arising out of what are known as complaints of charge.' It has also eliminated trouble in respect of stopped, or non-registering meters."

If, as appears from this quotation, that was the sole expectation, it does seem that the South Metropolitan Company have burdened the general body of their consumers with a most expensive method of eliminating this alleged "fruitful cause of grievance." My experience is that less than 0·1 p.ct. of consumers make these complaints, and that a fair proportion of them arises when pressure is exerted for payment. The class of consumer who is given a supply by ordinary meter is generally an intelligent person who is alive to his obligations and sets aside his income in accordance with known requirements; and though on rare occasions he gets mild shocks on receiving his gas and all other accounts, he is quite amenable to reason, in connection with both the rare "complaints of charge" and computations as a result of non-registration.

That is my experience with two companies, and the South Metropolitan consumer may—but, I imagine, does not—differ greatly from those of other undertakings. Therefore, when the consumer who has been forced to have a monthly account realizes that he has it at the expense of multiplication by three of the labour of meter reading and accounting, coupled with the additional invasion of his premises and frequency of the trouble of payment, he may be excused for wondering whether the Company's consideration for his comfort was ill-advised. It may be argued that mechanical methods of accounting have prevented additional expense to the consumer, but what would have been the saving if the mechanical methods had been applied to the old quarterly system of accounting?

The secret, or explanation—for it is no secret—of the contented consumer is in "Service;" in constant preaching to the employee that the consumer, Company, and employees are bound together in a trinity of mutual confidence and faith, and that he destroys the bond at his own, and his colleagues', peril.

RENTAL SUPERINTENDENT.

Feb. 28, 1930.

Commercial and Industrial.

Stock Market Report.

[For Stock and Share List, see later page.]

Business continued quiet in the Gas Market last week; and, with the exception of the gilt-edged section, which was distinctly buoyant by reason of the anticipated reduction in the Bank Rate, the general tone in most markets gave little cause for optimism. The shadow of the Budget and the bad state of trade in most industries are doubtless the dominating factors towards this end.

With few exceptions business was confined to the stocks of the London and Suburban Companies. Apart from the Gas Light and South Metropolitan ordinary stocks, the sliding-scale and maximum dividend stocks of the Croydon Company, and Tottenham ordinary were well supported, and buyers of these stocks at current prices (as we intimated last week) should have every reason to be satisfied with their purchases. As will be seen by reference to the Stock and Share List, there were few changes in the quotations. The only increase was that of the Newcastle ordinary which was in demand on the local exchange, and the price increased by 4½d. per £1 unit to 16s. 6d. As this price the yield, on last year's dividend (£5 7s. 6d.), is slightly over 6½ p.ct. The Company is in a strong financial position; and with high-class security offered, it is reasonable to assume that some improvement in the value of this stock can be looked for in the near future. There were slight depreciations in value in Gas Light £1 units by 1½d. to 17s. 7½d., and in European £10 shares by a further ½ point.

Among last week's dividend announcements for the past half-year were: Brighton and Hove, £3 15s. and £3 7s. 6d. on the 6 p.ct. and 5 p.ct. consolidated stocks respectively, making £7 10s. and £6 15s. for the year (same); Hastings and St. Leonards, £3 10s. and £2 15s. on the 5 p.ct. and 3½ p.ct. converted stocks, making £7 and £5 10s. for the year (same); North Middlesex, £3 15s. on the consolidated stock, making £7 10s. for the year, against £7 1s. for 1928; and South Shields, £4 5s. on both the consolidated and new stocks and £2 17s. 6d. on the ordinary stock, making £8 10s. and £5 15s. for the year (same).

Coal Markets.

Current reports from the markets indicate no change for the better, and optimism in the shape of increased production seems to have been overdone. The export demand, both for prompt and forward positions, is very quiet indeed. As regards prompt, the slackness is accounted for in large measure by the excessive stocks which have been laid in everywhere on the Continent as compared with the mild winter. For forward trade, there is little inducement for foreigners to buy until their position under the quota system is clearer. It is, of course, the secondary and poorer qualities which are suffering most, and, in ordinary brands of Durham gas and coking coals, for example, prices are at present more or less "anywhere."

One or two small sales are reported from the Newcastle market, as, for instance, 12,000 to 15,000 tons of gas and coking coals for Helsingfors in the summer months, and 9000 for Malmo. But prices are not disclosed. Wear special gas coals are quoted at 17s. f.o.b., and best qualities at 16s. 6d. Seconds are only nominally 14s. 6d. Good coking coals are round about the same figure, and bunkers are weak and offered. Official Yorkshire export prices show an all-round decline at 17s. 6d. to 17s. 9d. f.o.b. for screened gas, 17s. to 17s. 3d. washed trebles, 16s. 3d. to 16s. 6d. doubles, and 14s. 6d. to 15s. singles.

Gas coke trade is very quiet, and 22s. seems to be about the average value.

Trade Notes.

Hartlepool Gasholder Contract.

The contract for a new 750,000 c.ft. capacity gasholder for the Hartlepool Gas and Water Company has been placed with the Whessoe Foundry Company, of Darlington.

Spiral-Guided Holder for Newcastle Company.

The official order for the new 3 million c.ft. spiral-guided gasholder to be erected in the Newcastle-upon-Tyne and Gateshead Gas Company's Howdon area has been placed with the Furness Shipbuilding Company, Ltd., of Haverton Hill-on-Tees.

Cast-Iron v. Steel Pipes.

The Staveley Coal and Iron Company, Ltd., of Hollingwood, near Chesterfield, have published an illustrated brochure to prove that cast-iron pipes are more efficient and enduring than steel pipes, and therefore the cheapest. The following is a quotation from the booklet: In the last few years great improvements have been effected in the manufacture of cast-iron pipes. In all high-class pipes the composition of the pig iron used is under strict control, and produces castings of predetermined composition to conform to a specification acceptable by all qualified engineers, and carefully tested under strenuous and difficult conditions. In fact, from actual working conditions and many thousand different installations, the length of life of cast-iron pipes is such that, taking the widest possible survey, no wrought-iron or steel tubes can be put in the slightest comparison with them.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

London, *March* 3.

The prices of tar products remain unchanged.

Creosote for export is 6¼d. to 6½d. per gallon f.o.b.

Pitch is 47s. 6d. per ton f.o.b.

Pure toluole is 2s. 5d. to 2s. 6d. per gallon; solvent naphtha, 95/160, about 1s. 5d. per gallon; pure benzole, about 1s. 11d.; and pyridine bases, 3s. 9d. per gallon.

Tar Products in the Provinces.

March 3.

The average prices of gas-works products during the week were: Gas-works tar, 21s. 6d. to 26s. 6d. Pitch, East Coast, 46s. f.o.b. West Coast (f.a.s.)—Manchester, 40s. 6d. to 41s.; Liverpool, 44s. to 45s.; Clyde, 44s. to 45s. Toluole, naked, North, 1s. 7¼d. to 1s. 8½d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 3d. to 1s. 3½d. Heavy naphtha, North, 1s. to 1s. 0½d. Creosote, in bulk, North, liquid and salty, 3½d. to 3¾d.; low-gravity, 1¼d. to 1½d.; Scotland, 3½d. to 3¾d. Heavy oils, in bulk, North, 5½d. to 6d. Carbolic acid, 60's, 2s. 4d. to 2s. 5d. prompt. Naphthalene, £12 to £14. Salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Tar Products in Scotland.

Glasgow, *March* 1.

Motor benzole shows a slight drop in value owing to buyers having covered their immediate requirements; but other products are as last quoted. This market is rather quiet at present.

Pitch is without interest, and export value is nominal at 47s. 6d. to 50s. per ton f.a.s. Glasgow. Home orders are also falling away, the price being easy at 5s. premium on export price.

Tar remains quiet for prompt, but value is steady at 4d. to 4¼d. per gallon f.o.r. makers' works in buyers' packages.

Creosote.—There has been a slight revival of interest in the home market; but quotations are unchanged at 3⅞d. to 4⅜d. per gallon for B.E.S.A. specification, 3d. to 3½d. per gallon for low gravity, and 3d. to 3½d. per gallon for neutral oil—all *ex* works.

Cresylic is in better demand, but no alteration in values can be recorded. Pale 97/99 p.ct. is 1s. 8¾d. to 1s. 9¾d.; dark 97/99 p.ct., 1s. 7¼d. to 1s. 8¼d.; pale 99/100 p.ct. 1s. 11½d. to 2s. 0¼d.; high boiling, 1s. 10d. to 1s. 11d—all per gallon f.o.r. works in bulk quantities.

Crude naphtha is unchanged at 5½d. to 6d. per gallon free on rails works.

Solvent Naphtha.—90/160 grade is 1s. 2½d. to 1s. 3½d. per gallon, and 90/190 grade 1s. 0½d. to 1s. 1½d. per gallon, with very few orders passing.

Motor benzole is easier at 1s. 6d. to 1s. 6½d. per gallon f.o.r. works in bulk.

Pyridine.—90/140 is 4s. 3d. to 4s. 6d. per gallon; 90/160, 3s. 3d. to 3s. 6d. per gallon; 90/180, 2s. 6d. to 2s. 9d. per gallon; 90/220 unsaleable.

Benzole Prices.

The following are considered to be the market prices at the present time:

	s. d.	s. d.	
Crude benzole . . .	0 10 to	0 11	per gallon at works
Motor ,, . . .	1 5½ ,,	1 6½	,, ,, ,,
Pure ,, . . .	1 10 ,,	1 11	,, ,, ,,

Applications for Patents.

[Extracted from the "Official Journal" for Feb. 26.]

Nos. 5182—5989.

Bamag-Meguin Akt-Ges.—"Limiting explosion risks in gasholders." No. 5836.

Becker, A. C.—"Production of combustible gas." No. 5547.

Becker, A. C.—"Distant gas control." No. 5548.

Bertelsmann, W.—See Becker, A. C. Nos. 5547, 5548.

Dempster, Ltd., R. & J.—"Mouthpieces for gas-making retorts, &c." No. 5500.

Gas Accumulator Company (United Kingdom), Ltd.—"Gas-light signal apparatus." No. 5250.

Holt, C. E.—See Dempster, Ltd., R. & J. No. 5500.

Jacob, C.—"Safety devices for gas cooking stoves." No. 5420.

South Metropolitan Gas Company.—"Meters." No. 5887.

The employees of the Bristol Gas Company have made during the past year contributions to local charities amounting to over £284.

When a break occurred in the bank of the Colne Valley Water Company's "lagoon" on Feb. 24, and 120,000 gallons of water poured out into Watford High Street, the offices of the Watford Gas Company were temporarily isolated.

Topical Items.

Mr. Goodenough Speaks on Salesmanship.

In a speech on "British Salesmanship Overseas," before the Oxford Luncheon Club on Friday, Feb. 21, Mr. F. W. Goodenough, C.B.E., Chairman of the Government Committee on Education for Salesmanship, said: By salesmanship I mean not merely nor mainly the work of the outdoor commercial traveller and of the indoor salesman, nor even of the sales manager controlling them, but the whole science and art of finding, catering for, and developing markets for the products and services of our manufacturers. By Education for Commerce we do not mean merely the teaching of shorthand, typewriting, accountancy, secretarial work, office methods, and so on; they are, as I have said elsewhere, no more "commerce" than scoring in the pavilion, or rolling the pitch, or arranging matches with other club secretaries, is cricket. Commerce is the great game—the joyous adventure, the fight, the risk, the service to the community—that calls for leadership, organization, judgment, skill, energy, and devotion to principle and to duty.

Commerce is not book-keeping, but bond keeping; not keeping accounts, but keeping your word, and going one better if you can. It is not just making money; it is making friends of your customers; it is making work for an ever increasing number of employees; it is making an honourable name as well as a living for yourself; it is matching your skill and nerve and judgment against another's, while playing the game like a sportsman.

I plead the cause of living languages—spoken fluently, thought in easily, as well as studied as literature—as an essential part of the education of everyone, so that we may no longer be ashamed to meet our visitors within our gates or our competitors in the markets of the world, where all too often we have to employ an interpreter while they converse with customers in their own tongue. I plead that history and geography and economics be studied not only in their general aspects, but also in their most practical relationships to commerce and industry; and that English be learnt not merely to enable the student to read English literature, but also to enable him to speak it acceptably and write it lucidly and logically as a relation of facts to be reported or of arguments to be presented.

Finally, I plead for the most cordial and close co-operation between the universities and the public schools and the technical colleges, and between them all and the world of business, so that we may work together with energy and harmony to the end of making our educational system most truly serve the purpose of producing men and women with the wisdom, ability, knowledge, understanding, and determination needed to ensure their happiness in life, their success in business, and the welfare of their country.

An Orifice Meter which Gives Numerical Readings Automatically with Corrections for Pressure, Gravity, and Temperature.

Writing in the "Gas Age-Record," E. A. Munyan, of the Union Gas and Electric Company, Cincinnati, describes "the latest type of industrial metering equipment," the use of which will apparently be the first time the new Linderman electrically operated orifice meter has been used in the measurement of gas to industrial consumers. It will be located at a steel mill in Northern Kentucky, served by the Union Light, Heat, and Power Company. This steel mill has a consumption of 20,000 c.ft. per hour at present, and its ultimate consumption will be 900,000 c.ft. per hour. The 12-in. size Linderman orifice meter measures the gas flow from 0 c.ft. per hour to 640,000 c.ft. per hour, and corrects automatically for change of gravity, pressure, and temperature, and brings the amount of gas right down to a previously determined standard without any further measurement or chart calculation.

In addition, it shows the actual cubic feet of gas passed in numbers, and records the amount on a chart. This enables the customer to determine at any time the amount of gas he is using, without a lot of complicated calculations and without delay. Such an installation creates confidence in the customer, states Mr. Munyan. The building housing the equipment is 30 by 18 ft., and the original plans called for a building 72 ft. by 30 ft. to house the regular orifice meter runs. By the design of the metering equipment, to use the Linderman meter, no doubt the customer was saved about $10,000.

Such meter installations, concludes the writer, give the Company higher standing in the opinion of the customers, and are bound to react to the benefit of the Company and aid in the increased use of gas.

Change of Dates for Institution of Gas Engineers' Examinations.

Owing to the date of Easter this year, the Chartered Gas Engineers' Examinations will not be held this year on the dates provided for by the Education Scheme, but on:

Gas Engineering, Saturday, May 3.
Gas Supply, Saturday, May 10.

The Most Successful of All British Industries Fairs.

The Heavy Section of the British Industries Fair at Birmingham came to an end last Friday evening. It lasted eleven days, and the reports received during the latter part of last week by the Birmingham Chamber of Commerce, who are responsible for this yearly trade event, showed that this was the best trade fair of the series. As previously mentioned, records were set up as to the size of the Fair and the number of exhibitors (1000), and it may now be definitely stated that the business done, both actual and potential, was in keeping with the general advance of the Fair. There appears to be every probability of further extensions being undertaken for the 1931 exhibition, with possibly additional new sections.

During the first week of the exhibition, the number of overseas buyers showed a little falling-off, but the figures for the second week were most encouraging, and, on balance, visitors from abroad would probably be slightly in excess of 1928, which was a record year. There can be no doubt that the Fair is making an increasingly strong appeal to merchants and retail houses in the home market, and everything pointed to the fact that the home trade showed a most substantial advance.

On Friday a representative of the "JOURNAL" made inquiries at the Information Bureau in the Gas Section of the Fair, and of some of the leading exhibitors, as to business done. There was a consensus of opinion that the number of trade inquiries received was distinctly in advance of any previous year. Quite a good number also reported that the business actually done was "satisfactory." It would appear, however, that by far the bulk of the orders taken were for the home market.

Queries and Impressions.

[FROM A CORRESPONDENT.]

Why anyone objects to town planning schemes after visiting Birmingham City.

How the brilliance of the public lighting in Victoria Square created a comparative gloom beyond.

The neighbourliness of the Nechells Gas-Works and Electricity Generating Station. Has the Smoke Abatement Society ever visited the latter?

The opportunity missed in demonstrating a good ventilating system at the Fair.

The splendid heat and wonderful adjustment of the gas-fires.

Was the spinning barrel full or empty?

The excellence of the finish of the "chromium" fittings.

The wealth of the demonstrator of the three-coin prepayment meter attachment.

Would a one-way traffic system have eased the congestion caused by narrow gangways?

What does the Chinaman think of the willow pattern forsaking crockery for cookery?

Were adjoining exhibitors pleased at being blotted out by the crowds watching athletic demonstrations in the ship's gymnasium.

If the number of weighing machine exhibits is the result of the popularity of the eighteen days' diet.

If coffins, why not a gas-heated crematorium?

The excellence of the industrial furnaces, and how some would have liked their gas consumption if only for the "duration."

The beauty of the modern gas engine.

"Not as blue as it looked." Compare order book and exhibit of a certain west country firm.

The wonderful effects in wood, metal, and ornamental tile work.

The paucity of gas lighting exhibits.

The thoughtfulness of the "GAS JOURNAL" in giving an opportunity to peep into the "situations vacant" column.

Western Juniors Visit the Exeter Gas-Works and Showrooms.

Members of the Western Junior Gas Association visited the works of the Exeter Gaslight and Coke Company on Feb. 15, where they were welcomed by Mr. W. Westlake, the Engineer and Manager. A tour of inspection was made, including the tar plant, the vertical retorts, the carburetted water gas plant, and the coal handling telpher plant.

The party adjourned for tea, at the invitation of the Directors of the Company, to whom a hearty vote of thanks was proposed, coupled with the name of Mr. Westlake. The latter, in reply, stated that he was always ready to help forward the cause of the Junior Gas Association. The members had seen, during the afternoon, a works which had been practically reconditioned, with a view to further development for the next 25 to 30 years. A new spiral-guided holder was in course of erection.

The members then visited the showrooms of the Company, after which a paper on "The High-Pressure Distribution of Gas," by F. W. Sansom, of Exeter, was read. This and the discussion will be found on later pages of our issue to-day.

Sale of Maldon Gas Light Company.

The Annual Meeting of the Maldon Gas Light Company, Ltd., was held at the Company's Offices last Thursday, Mr. H. J. FREEMAN, Chairman of the Directors, presiding.

The report of the Directors was of a satisfactory nature on the year's working. With reference to a circular letter dated Jan. 31, 1930, and sent to the ordinary shareholders, informing them of an offer made by the British Gas Light Company, Ltd., to purchase the whole of the ordinary shares at the price of 16s. per share, the offer had been accepted in respect of more than the required minimum number of 90 p.ct. of the shares. This had become effective, and it was expected that the sales would take place during March. The Directors recommended that the arrears of dividend on the preference shares in respect of the years 1925-28 inclusive, and also the dividend for the year 1929, be paid, *less* tax, on March 14, 1930, and also that a dividend of 2½ p.ct., free of tax, be paid on the same date on the ordinary shares in respect of the year 1929.

The CHAIRMAN said that this was the last meeting at which they would be present as shareholders. The past year had been a satisfactory one. The offer to sell had been accepted, and of the 14,760 shares held all the owners had accepted with the exception of 278 shares. The Directors thought it wise to enter into negotiations for the sale, and a sum of £24,000 was involved. In the end, they thought that the offer of 16s. per share with the approval of the purchasers was one that they could not turn down, so they recommended the acceptance. He was glad that Mr. W. W. Townsend, the Consulting Engineer, and Mr. W. J. Mulley, the Manager and Secretary, were continuing with the new Company. He proposed, and Mr. S. A. BELL seconded, that the report be adopted, and this was unanimously agreed to.

A special vote of thanks was accorded to Messrs. Mulley, Townsend, and the staff.

Mr. W. H. DE CAEN, in proposing a vote of thanks to the Chairman, said that it was with a feeling of regret that they came to the end of the old Maldon Gas Light Company. His skilful negotiations with the purchasing Company had been to the benefit of the shareholders. The resolution was carried.

S.M.G.C. Railway Expresses.

Two new locomotives, each capable of drawing a load of nearly a hundred tons, and driven by petrol distilled in the process of the manufacture of gas, have just been put into commission at East Greenwich. Hundreds of thousands of tons of coal from the Northumberland and Durham mines are brought during the winter months to the Thames-side stations of this model railway (which is the property of the South Metropolitan Gas Company) to provide light and heat for more than 400,000 South London homes. Though very few gas consumers realize the comprehensive nature of this railway, the S.M.G.C.R. has been in existence for more than forty years.

There are now twenty-two locomotives in service, and a regular time-table is adhered to. Express trains deal with the discharge of coal, and the loading of coke at the docks for export to the Continent. At the jetties the railway is elevated 40 ft. to expedite the handling of goods to and from the steamers. There are more than twenty miles of railway track connecting the various depôts of the South Metropolitan Gas Company.

Over a hundred men are employed on work in connection with the railroad, including engine-drivers, firemen, signalmen, guards, checkers, donkeymen, &c. There are five main signal boxes, and, owing to the large number of branch lines, an intricate system of signals is maintained.

Some idea of the activities of the railway may be gathered from the fact that during February approximately 3000 tons of coal was unloaded every day from steamers at the jetty. In addition to coal and coke, iron and steel goods and oil and petrol are also transported. No passengers, however, are allowed to travel on the railway.

Many of the wagons and trucks in use are made in the Company's own workshops, where they are also repaired and overhauled. They are made to a special design, and, to facilitate rapid unloading, are discharged by the touching of a small lever.

Cardiff Gas Company's Athletic and Social Activities.

There was a happy gathering at the ninth Annual General Meeting of the Cardiff Gas Company's Athletic and Social Club, held at the Grand Hotel on Friday, Feb. 28, Mr. H. D. MADDEN, General Manager and Chief Engineer, presiding.

In the Council's report for the past year it was stated that the financial results showed an improved balance on the year's working, after providing for the full requirements of the various sections. Most of the sections, it was stated, had continued to function successfully, and incidentally it was pointed out that the Association football team was now in the first division of the Cardiff and District League. The air-rifle section had won the Cory Cup. The extension of the recreation ground at Grangetown had now been made and provided a useful additional space for the requirements of the various sections. A notable feature of the year's tournament, it was stated, was the inclusion of a gardens competition, which evoked much interest.

Mr. MADDEN, who was supported by Mr. R. J. Auckland, Mr. B. J. Bell, and others, in proposing the adoption of the report and statement of accounts, referred to the successes of the various sections and appealed for support in all their ramifications, particularly from the younger members. He dwelt on the training of the mind as well as the body, and asserted that the gas industry was successfully facing stern competition, and it behoved all those connected with the industry to fit themselves by technical education to discharge their duties, and the maintenance of the health of the body made them fitted for the training of the mind.

Mr. R. J. AUCKLAND seconded, and appealed to the members to make their contribution to their co-operative magazine.

The following were elected Council members: Messrs. J. H. Wilde, A. E. Hall, A. James, G. Nash, A. W. Whitlock, and H. Boucher; and the following were re-elected: Hon. Secretary, Mr. F. H. Osborne; Organizing Secretary, Mr. W. G. Denly; Assistant Organizing Secretary, Mr. F. Bruford; Treasurer, Mr. P. V. Price; and Auditors, Messrs. J. Evan Jenkins and Wilfred Jones.

The President then distributed the prizes and was given an enthusiastic vote of thanks.

The song of the evening, written by a member of the Company's staff, was entitled "The Song of the Therm," rendered to the tune of "An Old-Fashioned Town." The words are as follows:

THE SONG OF THE THERM.

I'm an old fashioned Therm in a new fashioned House
And I don't feel a bit out of place,
For wherever I am, there is never a grouse,
I bring smiles to each weary face.

Chorus:

The work is soon done, if to me it is shown,
Just while you are taking your rest,
Your Dinner I'll cook, without even a look,
And my cost, why, to you 'tis a jest.

Now this wonderful Therm, list to me and you'll learn
How its source is the health-giving Sun,
From the coal where 'tis stored, now its freedom restored,
It will serve you as second to none.

Chorus:

For light or for heat, in the home or the street,
For both washing and ironing it's best,
Its radiance is sweet, its convenience ne'er beat,
A good servant that won't take a rest.

Press a switch if you will, and the Therm it will fill
Any room that you enter—with Light,
And what's much better still, when you get the Therm bill
It need never cause you the least fright.

Chorus:

So while to and fro', through the world you will go,
The Therm you will find is the best,
And now that you know, Just remember to go
To the firm with the Therm as its Crest.

—F. J. B.

Gravesend Employees' Social Association Annual Dinner.

The Annual Dinner of the Gravesend and Milton Gas Light Company Employees' Social Association was held at the Bat and Ball Hotel on Feb. 21. The enjoyable function seems to go on from success to success. Close on 100 members of the Association, with the Directors and other guests, were present, and the evening passed rapidly in a most harmonious manner. The cordial terms which exist between the Directorate, Management, and the employees was most evident. The speeches were mostly in lighter vein, and an original and clever musical and humorous programme was carried out by the members themselves.

Mr. W. A. Howie (Manager and Chief Engineer) occupied the chair.

Mr. W. A. Hammond (Chief Clerk) proposed the toast of "The Gravesend and Milton Gas Light Company," and said that in the days when he joined the Company they had 2000 consumers; to-day they had 8000 on the books. During the last six years the progress had been the most marked in any period of the history of the Company. That was largely due to Mr. Howie, their Manager and Engineer. He coupled with the toast the name of their Chairman, Mr. George Sandford, J.P.

Mr. Sandford, responding, said theirs was not a rich Company, but it should be a lasting one. Being a utility Company they were not able to put away a reserve, but he was sure they would go on from year to year successfully if they all pulled together, the Directors doing their bit and the men theirs. "I am glad to see you all to-night," concluded Mr. Sandford. "It shows how amicably we can all work together and is an example to any Company in the town and district or in the country."

Capt. C. Tuff, J.P., C.C., submitted the toast of the "The Employees' Social Association," and Mr. Howie responded.

British Toasted Fuel, Ltd., have been registered as a private Company, with a nominal capital of £2000, to acquire existing inventions relating to the carbonization of coal by improved methods.

Newport Gas-Works Benefit Society.—The 44th annual dinner of the Society was held at the Westgate Hotel, Newport, on Feb. 24, when the good work of the Society, which provides sickness and other benefits, was mentioned. Mr. J. H. Canning, O.B.E., Hon. Treasurer of the Society, was in the chair.

"Daily Mail" Ideal Home Exhibition.—As usual, the gas exhibits in the Heating and Lighting Section at the "Daily Mail" Ideal Home Exhibition will be of considerable interest. It will be demonstrated that gas heating and lighting maintain their popularity, and that to-day they have reached a very high standard of efficiency.

Weston-super-Mare Stock Issue.—As will be seen from our advertisement columns, Messrs. A. & W. Richards, of 37, Walbrook, E.C. 4, are offering for sale by tender, on behalf of the Directors of the Weston-super-Mare Gaslight Company, an issue of £30,000 6 p.ct. redeemable preference stock. The minimum amount of stock which may be tendered for, or will be allotted, is £50. Tenders must be received not later than 11 o'clock a.m. on Friday, March 14.

Gas Main at Too Shallow a Depth.—At Banbury County Court on Feb. 26, Miss Minnie Blundell, of Middleton Road, Banbury, was awarded £75 damages and costs against the Banbury Gas Company for injuries received in a gas explosion in High Street, Banbury, on Feb. 19 last year. A workman was using a blow-pipe in a post office telephone manhole, when there was an explosion of gas which had escaped from a fractured main. The Gas Company claimed that the fracture of the main was due to an act of God, being caused by frost. Judge Drucquer ruled that the main was at too shallow a depth for modern requirements, and said the Company was responsible. A stay of execution was granted for three weeks pending an appeal.

Discussion In Regard to New Holder at Bexhill.—The Gas Committee of the Bexhill Town Council have recommended that the question of taking a bulk supply from the Hastings Gas Company should not be proceeded with further, and that the necessary steps be taken with a view to the provision of a new gasholder. Councillor Curram moved as an amendment that a bulk supply be obtained from Hastings at the quoted price of 7d. per therm while the present holder was being reconditioned. He said a new holder was not needed. Councillor Clifford, seconding, said though they produced gas at Bexhill at 5·9d. per therm, the extra cost would be worth while for a short period to avoid getting a new gasholder. The amendment was heavily defeated, and the report adopted. The Mayor said the matter would be the subject of an inquiry, and he promised a public statement later.

Dual Meter Reading.—A suggestion that a system of reading gas and electricity meters in Blackpool should be done by one inspector, thereby saving time and expenses, has been turned down. The head officials of the departments concerned expressed the opinion that joint reading would not be economical in practice, and there was no advantage in it. The Committee have decided to continue the present system.

Gas Exhibition at Ilkley.—The Ilkley Urban District Council Gas Department, in co-operation with a number of appliance manufacturers, opened an exhibition of gas appliances for domestic purposes, on Feb. 24, at the Winter Garden. The exhibition continued throughout last week. Demonstrations of cookery and washing with gas appliances were given twice daily, and prizes were offered for essays by school-children, who were given special facilities for attendance.

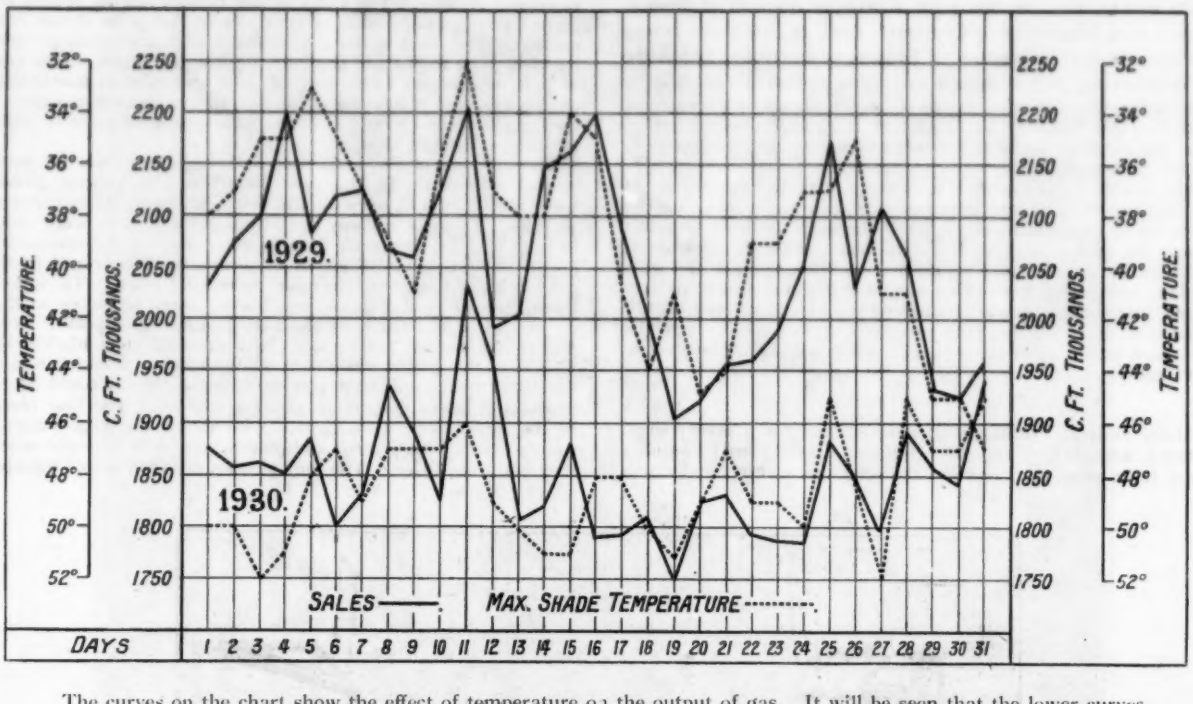
Larvite, Ltd., have been registered with a nominal capital of £30,000 to enter into an agreement with H. R. Seabrook, the Brakspur Syndicate, Ltd., and Lota, Ltd., to acquire the trade mark "Larvite," to construct roads, railways, harbours, power and supply plants, factories, and plant, machinery and other works for the refining, storage, and transport of coal tar, pitch, chemicals, and all other products and bye-products of coal; to manufacture and deal in tar, pitch, bitumen, oils, and chemical elements, &c. Registered offices: 8, Princes Street, London, E.C.

Gasholders Old and New.—On Wednesday last, Feb. 26, Mr. Leonard Hartley, a Director of Messrs. Clayton, Son, & Co., Ltd., delivered a lecture before the members of the Foremen's Mutual Benefit Society (Leeds Branch), on the subject of "Gasholders Old and New." The members turned up in good numbers to listen to a lecture on a subject which is practically foreign to those engaged in general engineering, and great interest was displayed in what Mr. Hartley had to say in regard to these engineering structures, which are so familiar to the general observer, but in regard to the working of which the man in the street has little knowledge. The various types of gasholder were commented on, from the rubber bag receptacle to the mammoth 20-million waterless "M.A.N." type of gasholder erected in Chicago. The lecture was illustrated by a very fine set of slides, showing gasholders from their earliest conception and development, in course of manufacture, erection, repair, and when completed.

Application to Borrow for Extensions at Exmouth.—A meeting of the shareholders of the Exmouth Gas Company has approved of application being made to the Board of Trade for a Special Order under the Gas Undertakings Act, 1920 and 1929, for the purpose of raising additional capital stock and loan capital amounting to £30,000. The Chairman, Mr. E. T. Linscott, said the progress of the Company was such that it was absolutely necessary they should enlarge their premises to afford more opportunity, not only for the manufacture of gas, but for its storage. They were led to believe that favourable consideration of their application in regard to the foreshore site was not to be expected, and a new site close to the works had since come to hand. The additional capital which they sought to raise would enable them to buy a site on which to extend their works, to erect a gasholder, and in other ways to assist the further development of the undertaking. The progress of the Company since the last meeting had been more than maintained; they had more than exceeded their anticipated curve of progress.

Belfast Gas Department and Local Tenders.—An effort by the Belfast Gas Committee to give a contract to a local firm, notwithstanding that its tender was not the lowest, has not been successful. The Manager (Mr. J. D. Smith) reported on the tenders received for the supply of ammonia stills for the chemical department of the gas-works, and intimated that the tenders ranged in price from £1000 to £1558. He recommended that the lowest be accepted. Reference, however, was made to the desirability of the work being executed locally, and it was resolved that details be furnished to the Ministry of Home Affairs, with a request that approval be given to the acceptance of a local tender, though not the lowest tender submitted, in view of the fact that a large proportion of the contract price was made up of wages, and would thus be expended locally. In due course the Ministry of Home Affairs intimated that it did not see any objection to the acceptance of this tender, as being the lowest tender from a local firm, but added that as the Ministry had not any statutory functions in the matter it would rest with the Corporation to satisfy the Auditor in due course that the acceptance of the higher tender was reasonable. The Manager consulted the Town Solicitor who gave it as his opinion that the object of expending the amount of the contract price locally was not a justification for accepting a tender other than the lowest, at an additional cost of £125, and that the Auditor would be quite justified in surcharging the excess, and he (the Town Solicitor) would be unable to advance valid reasons why the surcharge should be remitted. This settled the matter, and Horseley Bridge and Engineering Company, Ltd., obtained the contract.

January Sales of the Hastings and St. Leonards Gas Company, 1929 and 1930.



The curves on the chart show the effect of temperature on the output of gas. It will be seen that the lower curves, which represent the output of gas and the temperature during January of this year, are practically clear of the similar upper curves for the January of 1929. This year the first month's reduction in consumption is about 11 p.ct., and it is the more significant because the price of gas now is 10d., as against 10½d. in the January of 1929, and there are now more consumers and more heating appliances in use. For this striking diagram, which clearly shows the relationship between temperature and the gas heating load, we are indebted to Mr. Chas. F. Botley, Engineer and Manager of the Hastings and St. Leonards Gas Company.

The Turner Low-Temperature Carbonization System.

We believe that this is the seventh of the low-temperature plants in this country to be tested by the Fuel Research Station Staff under the scheme promulgated in 1924. It consists of a lagged-iron vertical retort, continuously operated, and internally heated by highly superheated steam somewhat similarly to the Sutcliffe-Speakman retort which was tried out at Leigh, except that the retort is kept under pressure to ensure intimate contact between the steam and the coal. The retort itself consists of a cylinder 4 ft. in diameter, 7 ft. high, surmounted by a truncated cone tapering upwards from 4 to 3 ft. in diameter over a further length of 7 ft. The coal is stored in a feeding hopper closed as to inlet and outlet by valves, and is fed periodically to the retort through a double-walled cylinder projecting into a "flared-out casting," from which the steam and products of distillation pass away to the condensers. Coke is withdrawn from the base of the retort by means of a helical extractor not unlike that used in Glover-West vertical retorts, and is received in a sort of hopper from which it is discharged by another valve into a cooling chamber; from this it is dropped into a metal box through a fourth valve. All these valves are connected together by a chain mechanism, which, though apparently complicated, gave no trouble in operation.

We are not quite sure what happens to the coke, and how much of it is suitable for use as domestic fuel. We are told that the whole of the solid residue is tipped out on the floor and quenched. It is then thrown into a tank filled with water. That which sinks is rejected and that which floats is sold as domestic fuel after screening. We had some trouble in ascertaining exactly how much solid smokeless fuel would be available for sale. Apparently only the large coke is smokeless; and if this means that portion over 1 in. screen, it would follow from the table on p. 13 that there would be about 7 cwt. available per ton of coal carbonized. Presumably the remainder would be used for raising the steam for the process, while the gas would be employed for superheating the steam.

The essential inefficiency of steam as a heating medium appears in the statement that, of 1577 B.Th.U. total heat in the steam supplied, only 337 B.Th.U. were given up in the retort, corresponding to 14·2 therms out of the 65·9 therms which had to be supplied to the retort per ton of coal distilled. These figures are to be compared with 24 therms for the amount of heat supplied to an externally heated retort carbonizing at 600° C., and (say) 30 to 40 therms for high-temperature carbonization.

This also explains the huge quantities of condensed steam which appear as liquor, of which there was no less than 464 gallons per ton of coal distilled, and which was naturally of so low a strength as to be "too weak for economical recovery of ammonia." The report says the liquor can only be considered as a waste product; but in most circumstances the disposal of this large volume of noxious liquor (containing 0·46 p.ct. of tar acids in solution, besides the ammonia compounds) would prove to be an acute problem.

Of the claimed throughput of 10 tons per day, only 5·5 was realized—a discrepancy which is explained by the statement that the coal was probably too large for the plant. The gas produced was apparently used "as a source of heat in the steam superheater."

It is unfortunate that in all these low-temperature tests, fuel consumption figures are so conspicuously absent. Thus, in the summary on p. 27, the gross yields of products per ton of coal are given; it would be extremely useful to indicate how much of the coke is available for sale as a domestic fuel and whether the 19 therms of gas produced is sufficient for superheating the steam. Fuel consumption figures are such an important item in carbonization costs that it is surely not too much to expect that in such a comprehensive test as the one described here, some indication should be given of the fuel requirements of the Lancashire boiler supplying the steam required for carbonizing, and of the "pressure producer incorporated in the same setting and fed by coke produced in the retort."

"T.A.M.B.T."

* Report of Test by the Director of Fuel Research on the Turner Retort installed at the Works of the Comac Oil Company, Ltd., Coalburn, Lanarkshire. Department of Scientific and Industrial Research; pp. VI. + 29, price 9d. Published by H.M. Stationery Office, Adastral House, Kingsway, W.C. 2.

Engineering in Gas-Works.

On Friday, Feb. 28, Mr. J. W. Curtis, of the staff of Messrs. West's Gas Improvement Company, Ltd., read a paper before the Manchester Association of Engineers describing the scope of engineering in the design and construction of gas-works. The paper was intended to convey to engineers not connected with the gas industry some idea of the range and variety of the engineering problems with which the gas engineer is called upon to deal.

Mr. Curtis opened with a brief account of the magnitude of the industry and a description of a typical gas-works, and he went on to describe in some detail the main items—the retort house, the coal store, coal and coke-handling plant, condensers, exhausters, washers and scrubbers, purifiers, meters and governors, and gasholders—in all of which his audience were very much interested. Towards the end of his paper the author described some of the problems in erection with which he had been called upon to deal, and these will be of interest to our readers.

Erection of Plant.

Many difficult situations arise which call for a sound engineering knowledge, and the engineer's ability and common sense have to be used to solve the problems of erection, which must be fully considered and arranged long before the actual erection takes place. There should be a minimum amount of tools and tackle which, while guaranteeing the safety of life and limb to the erectors, are adequate and efficient to do the work required of them.

Telpher Plant.

Fig. 1 shows in course of erection an electric telpher plant for the handling of coke from the retort house to various parts of the gas-works, over a large area. This plant consists of an overhead monorail 65 ft. above the ground-level slung from a system of lattice steel girders of long span carried upon latticed steel-work columns.

In the first place, it is very important that the monorail should be truly horizontal, so that the telpher machine can be propelled without undue loss of power. This calls for accurate setting out of the foundations, both in plan and in level, so that when the structure is erected the various columns and girders are assembled accurately. The erection of the latticed steel column structures, all of which are composed of square and triangular towers, and large latticed "A" frames, was carried out by means of steel tubular derrick poles. These poles are made in five lengths of solid-drawn steel tubes, making a total length of 80 ft. The lengths are not equal, and a minimum of two tubes can be used when only a short lift is required, and various lengths can be used up to 80 ft. long.

The top length of the pole is fitted with a cast-steel head bracket for carrying the lifting blocks. The bottom length is fitted with a foot casting and cradle for moving the pole about while still standing in an upright position. Each intermediate length of the pole is fitted with a large cast-steel flange, bored and faced to jigs for interchangeability. These flanges are shrunk on to the tubes and afterwards pegged by three rivets to ensure rigidity. The holes in the flanges are all drilled for turned bolts, which make a very strong flange to flange connection. The head of the pole is fitted with a swivelling circular steel plate for taking shackles for five guy ropes. This type of pole has proved to be very efficient and easy to manipulate on the job, and it has the advantage that when taken apart, it can be dispatched from job to job in an ordinary railway truck at ordinary freight charges.

The erection of the long span lattice girders calls for more special attention. In the case illustrated the longest girders were 110 ft. by 9 ft. deep by 5 ft. wide, weighing approximately 10 tons. To meet railway conditions these girders were made in four lengths, and turned bolts were used on the connecting joints. These separate pieces of girder were conveyed to the gas-works sidings on crocodile railway trucks. To unload these, special steel "goal-posts" were made in pieces so that on arrival of the truck in the sidings the "goal-posts" were placed astride the truck, and, by means of rope blocks, the weight of the girder was taken off the truck. This allowed of the latter being unloaded very quickly, so that it could be released and heavy demurrage charges avoided. The four pieces of the girder were then hauled with tackle on large-diameter rollers over a rough yard, and placed immediately under where they had to be lifted. The four pieces were then bolted together and made ready for lifting. Fig. 1 shows one of the girders being lifted. It was decided to lift the girders from each end, so that there would be no risk of breaking their backs.

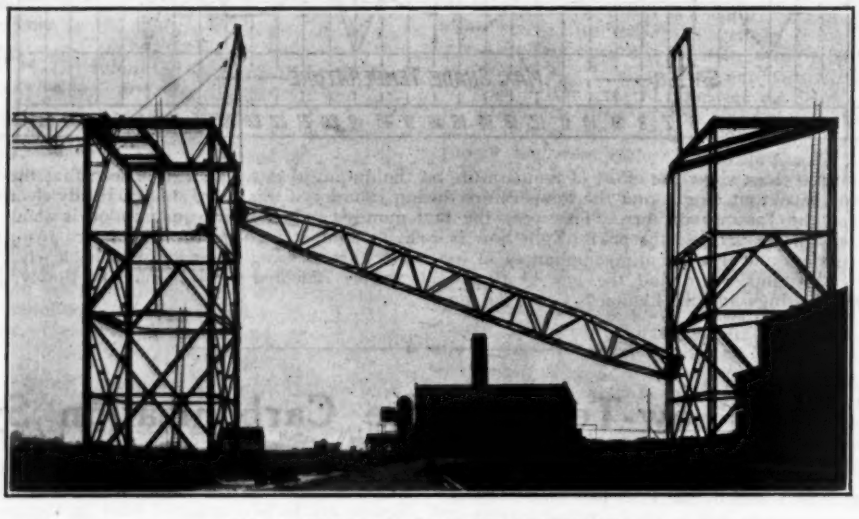


FIG. 1.—ERECTING TELPHER STRUCTURE.

For lifting the lattice girders, two special steel framed "goal-posts" were made, with hooks for attaching the lifting blocks. The feet of the "goal-posts" were made with hinge pins and cleats, to allow for moving over to land the girders when they arrived at the top of the towers. Each "goal-post" was guyed to the back of the tower by means of two sets of chain blocks, which allowed for very simple manipulation for raising and securing the ends of the girders, which had to be lifted in an inclined position to allow for clearing the supporting joists upon which they had to sit. The lifting was done by means of two sets of 2-ton hand winches on the ground, through two sets of wire rope blocks. The "goal-post" structures were lifted on to the top of the tower by means of two strong scaffold poles lashed together to form a short derrick pole on top of the tower.

Band Conveyor Girder.

During the erection of a plant in South America there were many interesting problems of lifting, but one which may be of special interest was the erection of a latticed steel girder, 120 ft. long, 9 ft. deep, and 7 ft. 6 in. wide, which had to span from the retort house to the coke hoppers to carry a band conveyor. The girder with all the rest of the structural steelwork was made in the works and to suit shipment conditions was shipped piece small, carefully marked for erection. The girder had to be built on the skew and also at an incline, the low end being 55 ft. from the ground and the high end 70 ft. from the ground. The girder was of light construction and weighed in all seven tons without the conveyor. A simple form of aerial ropeway was fixed to the two ends of the structures which had to carry

FIG. 2.—CONVEYOR GIRDER—RIO DE JANEIRO.

the girder ends. The cable was fixed at one end to the base of a column, and then carried over timber packings on the structure over the coke hopper to timber packings on the coke screen structure, then over to the ground, and passed around a snatch block at the base of another column, and back again all the way to the first column. Here one end of the cable was passed round the barrel of a hand winch, so that the cable could be given the necessary tension.

By means of an inclined jib at the high end, the several pieces of the girder frame were lifted and slung on to grooved rope pulleys. With the use of tail ropes which governed the paying-out from the high end, the pieces of the girder were allowed to run on the pulleys down the ropeway by gravity. Men rode on the separate pieces in order to make the necessary bolted connections until the whole of the structure was securely bolted up and fixed at both ends. Afterwards the ropeway was taken down and the conveyor parts lifted from the ground, from the girder itself, until the job was completed. Fig. 2 shows the girder in its final position.

FIG. 3.—WARSAW—ERECTING INSTALLATION OF VERTICAL RETORTS.

USE OF GUY DERRICK.

Fig. 3 shows the use of a large guy derrick in the erection of the bench bracing steel-work for a vertical retort installation in Eastern Europe. The photograph shows the erection taking place in wintry conditions—the temperature being actually several degrees below zero.

Comparative Working Results of the Three Metropolitan and Six of the Suburban Gas Companies.

STATEMENT SHOWING THE WORKING RESULTS AND THE REVENUE ACCOUNT COSTS PER THERM SOLD FOR THE YEAR 1929.

Compiled by Mr. F. J. Bradfield, General Manager and Secretary of the Commercial Gas Company.

—	Gas Light and Coke.	S. Metropolitan.	Commercial.	S. Suburban.	Wandsworth.	Tottenham.	Croydon.	Lea Bridge.	Hornsey.
Declared calorific value, B.Th.U.	500	560	500	500	470	500	500	500	500
Gas sold on declared calorific value, therms	244,777,610	94,558,911*c*	19,120,160	20,206,896	18,013,037	17,474,785	14,390,762	4,977,936	4,300,498
Increase, p.ct.	4·50	3·24*d*	Dec. 1·59	5·93	4·63	4·18	6·28	5·94	2·67
Gas made per ton coal on works tests, therms	71·77*a*	74·82	73·09	72·56	70·34	70·27	71·94	76·32	69·51
Gas unaccounted-for, p.ct.	3·91	1·24	6·48	9·06	7·30	5·35	5·90	3·35	2·81
Coke made for sale per ton coal, cwt.	10·20	9·98	10·70	9·35	9·68	11·12	10·54	9·99	10·92
Tar made per ton coal, galls.	10·21	9·59	9·28	9·71	9·15	11·07	9·72	14·57	13·80
Liquor made per ton coal, galls., 8 oz.	36·03	40·98	39·25	32·27	31·39	32·83	36·65	29·98	35·22
Percentage of coke used as fuel	18·77	17·71	20·70	26·24	22·53	19·34	20·37	23·23	16·00
Capital expended per therm sold	s. d. 1 8·47	s. d. 1 4·59*e*	s. d. 1 8·07	s. d. 2 0·94	s. d. 1 10·00	s. d. 1 10·19	s. d. 2 3·04	s. d. 1 9·85	s. d. 1 7·66
Price of gas per therm { L'day, Mid.	d. * d. 8⅜ 8⅜	d. d. 8⅜ 8⅜	d. d. 9 9	d. † d. 9 9	d. ‡ d. 7⅞ 7⅞	d. § d. 8½ 8½	d. d. 9½ 9½	d. d. 8⅜ 8⅜	d. d. 7½ 7½
Price of gas per therm { Michs, Xmas	8⅜ 8⅜	8⅜ 8⅜	9 9	9 9	7⅞ 7⅞	8½ 8½	9½ 9½	8⅜ 8⅜	7½ 7
Costs per Therm Sold. REVENUE ACCOUNTS.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.	3·27	3·14	3·79	4·34*i*	4·08	4·34	4·19	4·12	4·49
Less residuals—Coke and breeze	1·44	1·54	1·99	1·53	1·66	1·74	1·78	1·17	1·52
Tar	·39	·36	·35	·31	·28	·37	·28	·44	·39
Amm. liq. & sulph. amm.	·08	·13	·25	·01	·05	·04	·07	*Dr.* ·03	·07
Total residuals	1·91	2·03	2·59	1·85	1·99	2·15	2·13	1·58	1·98
Net for coals, oil, &c.	1·36	1·11	1·20	2·49	2·09	2·19	2·06	2·54	2·51
MANUFACTURE—									
Salaries	·14	·23	·19	·20	·25	·18	·18	·17	·27
Wages—carbonizing	·42	·64	·47	·59	·47	·56	·44	·52	·46
Purification	·05	·15	·09	·07	·13	·08	·06	·02	·08
Repairs—plant	1·90	1·95	1·66	1·54	1·71	2·11	1·31	1·62	·94
Net manufacture	3·87	4·08	3·61	4·89	4·65	5·12	4·05	4·87	4·26
DISTRIBUTION—									
Wages and salaries	·56	·35	·34	·47	·44	·28	·53	·12	·26
Repairs—Mains and services, &c.	·83	·63	·54	·93	·83	1·30	·73	·72	·76
,, Meters & prep. meters & fittings	·42	·67	·90	·84	·62	·52	·34	·42	·40
,, Stoves—ordinary & prepayment	·68	·60	·82	·52	·71	·46	·37	·83	·20
Total net manufacture & distribution	6·36	6·33	6·21	7·65	7·25	7·68	6·02	6·96	5·88
Rents, rates, and taxes	·65	·32	·44	·37	·25	·45	·51	·79	·49
MANAGEMENT—									
Directors, Auditors, and salaries (Secretary, &c.)	·10	·11	·17	·15	·13	·16	·20	·20	·25
Collectors	·18	·14	·29	·19	·21	·20	·25	·13	·06
Stationery and general charges	·12	·19	·21	·13	·25	·16	·21	·21	·15
Co-partnership	·10	·21	·26	·18	·32	·16	·20	·14	·12
Bad debts	·01	·02	·00	·01	·01	·00	·01	·02	·01
Law and parliamentary charges	·00	·01	·00	·01	·03	·00	·01	·01	·00
Superannuation, pension funds, &c.	·17	·19	·27	·17	·22	·19	·26	·06	·17
National Insurance	·06	·22*f*	·07	·06	·08	·07	·04	·05	·05
Sundries	·01	·01	·01	..	·01	..	·00	..	..
Total expenditure (*less* residuals)	7·76*b*	7·75*g*	7·93	8·92	8·76*j*	9·07*g*	7·71	8·57*l*	7·18*g*
GAS (*less* public lighting expenses)	8·21	8·15	8·36	8·88	8·29	8·73	9·10	8·36	7·31
Rentals—Meter & prep. meter & fittings	·82	·71	·75	·64	1·03	·46	·51	·51	·35
Stove	·56	·40	·56	·63	·86	1·56	·55	1·23	·70
Incand. mantle maintenance	..	..	·01	..	·12	..	..	..	..
Miscellaneous	·03	·02	·02	·01	·02	·25*h*	·15	·00	·04
Total—Gas, rentals, &c.	9·62	9·28	9·70	10·16	10·32	11·00	10·31	10·10	8·40
Balance, being profit	1·86	1·53	1·77	1·24	1·56	1·93	2·60	1·53	1·22
Dividend and interest	1·72	1·45	1·89	1·76	1·66	1·56	1·96	1·41	1·24
Surplus or deficit	·14	·08	Def. ·12	Def. ·52	Def. ·10	·37	·64	·12	Def. ·02
Contributions to funds and sundry payments	·15	·08	..	·02	·08	·34	·45	·11	·25
SUNDRIES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	20 4·63	19 0·10	21 2·80	23 3·70	22 3·35	25 1·76	25 11·15	28 9·57	27 1·00
Coke realized per ton coal	10 2·54	9 3·64	11 0·71	10 4·69	8 11·34	10 9·14	12 2·07	11 1·55	12 0·64
Coke ,, ,, ,, coke	20 0·40	19 2·34	20 7·95	22 2·65	18 5·69	19 4·17	23 1·05	22 3·32	22 0·92
Breeze ,, per ton	4 1·67	0 8·30	2 5·38	7 5·36	5 9·01	6 0·00	5 6·97	7 0·00	..
Tar ,, per gallon	0 3·37	0 2·69	0 2·55	0 2·80	0 2·10	0 2·53	0 2·11	0 2·96	0 2·46
Amm. liquor, &c., realized per butt, 8 oz.	1 8·34	2 0·48	3 10·42	0 2·63	1 0·94	0 11·20	1 5·34	Loss 1 0·38	1 9·44
Percentage of stoves at rental to consumers	98	113	102	111	87	88	83	72	43
Bad debts p.ct. on total receipts	·09	·14	·03	·05	·09	·02	·08	·14	·07
Net profit p.ct. on ordinary capital	6·34	6·70	5·52	3·68	7·18	9·12*k*	11·84	10·63	7·78
One-fifth penny variation equals gross	£203,981	£98,499*k*	£19,917*k*	£21,049*k*	£15,011	£14,562	£11,992	£4148	£3584
Water gas p.ct. on total make of c.ft.	29·42	..	1·61	..	13·87	23·32	29·34	37·20	37·00

a—Before benzole extraction.
b—Excluding exs. Grays and Pinner amalgns.
c—Including sales to South Suburban.
d—Excluding sales to South Suburban.
e—Ordinary stock of South Suburban eliminated.
f—Including co-partnership insurance fund.
g—Excluding special purposes fund.
h—One farthing variation.
i—Including gas purchased from South Met.
j—Excluding special purposes fund and capital duty.
k—Including electricity results.
l—Excluding special purposes fund and exs. re issue of deb. stock.

ADDITIONAL PRICES:
*—Brentford, ½d.
†—West Kent { Lady Day and Mid., ½d. / Michaelmas and Xmas., ¾d.
Northfleet, Michaelmas and Xmas, 3d.
‡—Wimbledon, 1d. Epsom, 2½d.
§—Waltham and Cheshunt, 4d.

Comparative Costs of Fuels for Domestic Purposes.

By A. H. BARKER, B.A., B.Sc., M.Inst.C.E.

[From a Lecture before the Joint Gas Conference, Birmingham, Feb. 19.]

(*Continued from p. 573.*)

When heated by coal fires day and night, for a whole week, in freezing weather, to the same degree as effected by the hot water circulation, the consumption of fuel for the whole house would have been 4743 lbs., costing 84s. 6d. This is calculated from the actual consumption of the fires which were used.

When heated by gas fire alone, the three large sitting rooms alone consume day and night, in one week, 17,073 c.ft. If all the bedrooms and passages of the house had been heated by gas fires to produce the same effect as the central heating system does, the additional consumption is calculated at 27,622, making in all 44,695 c.ft., which would cost 186s.

The consumption of electric power is calculated from the assumption of 100 p.ct. efficiency and from the known heat losses from the building.

The actual service conditions during the winter, however, are irregular, depending on the season and on the conditions under which the building is being used.

TABLE IV.—*Central Heating, Average Fuel Consumption, Coke and Gas. Actual Average Fuel Consumption in Heating Boilers per Week under Ordinary Service Conditions by Test as Described in Text* (6 *Winter Months*).

Heating Means.	Average Total Fuel Actually Burnt per Week.	Equivalent B.Th.U. per Week in Fuel Used.	Rate.	Actual Cost per Week.	Comparative Percentages of Costs.	
Calculated requirements = 15,200,000 B.Th.U. from 30° to 60° in 24 × 7 hours = 168 hours per week.						
Coke-fired Ideal boiler . . .	984 lbs.	12,200,000	40s. ton	15s. 8d.	27	100
Gas-fired Potterton boiler (low heating at night)	13,850 c.ft.	6,900,000*	10d. therm	58s.	100	370

* Difference due to (*a*) greater efficiency of gas boiler.
(*b*) superior control.
(*c*) thermostatic equipment.

The actual consumption in cold weather of the hot water circulation only with no fire of any kind is found to be as shown in table. The temperatures may be taken to be roughly 35° to 60°.

Coke 984 lbs. per week, costing 15s. 8d., or rather more than half what is consumed in full continuous heating for a week working 24 hours per day.

Of gas, 13,850 c.ft. per week, corresponding to about 69 therms, costing 58s. or about 3·7 times as much as the coke.

The consumption naturally varies according to the external temperature; the figure given is the average. It varies from 600 lbs. of coke in mild weather to 1350 lbs. in extreme weather, including the conservatory.

COAL, GAS, AND ELECTRIC FIRES.

It was not thought possible to make a reasonable practical comparison *in actual service conditions* with such fires as the *only* means of general heating of the entire house up to the standard attained by the central heating system, because in ordinary use fires would not be used at all in many of the rooms and not at all in the halls and passages. The conditions would be entirely artificial, and so different from those of practical use that the results, as representing service conditions, would be indeterminate and meaningless. Cost comparisons of coal, gas, and electric fires must, therefore, be dealt with separately on the basis of single rooms.

This series of observations, therefore, aimed at as close a comparison as possible between the running costs in three rooms used for widely different purposes.

As the effect of radiant heat is essentially different from that of convective heat, it is evident that a strict comparison in a room is rendered extraordinarily difficult, it may even be said to be impossible. The most that can be done is to compare the running costs when the two are so worked in actual use to secure approximately the same degree of comfort, so far as this can be measured by the senses—a very uncertain and variable criterion, especially where the inhabitants are carrying on their ordinary avocations and not paying particular attention to the heating effect.

METHODS OF TEST.

The "practical method" is to use the three kinds of fires in succession in the same room in the care of the same people using the room, asking them to regulate each according to requirements successively for a month at a time each, the total fuel burnt in each case being recorded, the assumption being that they will be used in each case to a similar degree of intensity—a very large assumption. At any rate the results do represent what is the actual relative cost in the particular conditions of the three methods of providing an open fire.

The results of such a trial cannot be expected to show any sort of uniformity. They must depend on accidental circumstances. They would have no meaning unless they were carried out over a long period of time. In each case the comparison must depend on the way the room is used. In any case a result which applies to one room used for one purpose would not apply at all to a room used for another. The trial was, therefore, made in three different rooms used for entirely different purposes.

The fires used were those ordinarily required for the comfort of the establishment, to raise the temperature 10° above the uniform one provided by the central heating, and to give the radiant heat necessary for adequate comfort.

The practical trials are broadly divided into two types of use:

The first applies to the case where the room is in continuous use and it is necessary to have a fire all the time, as in the morning room.

When the fire is continuously maintained these results show the gas and electric fires at their comparative worst.

These tests were made keeping the gas fire alight the whole day and turning it up or down, according to the occupant's idea of the current requirements. In these conditions the consumption was much greater than with only the strictly necessary use, which expression cannot be precisely defined.

The second applies to ordinary rooms, which are not in continuous use, but are used as required. When any careful person occupies such a room for more than a few minutes he would light the fire and turn it out, or switch it off, when leaving, just as he would the electric light. These are the conditions in which a gas fire shows up to greatest relative advantage.

To use this method to the greatest advantage the fire, whether gas or electric, should be arranged to be turned on or off by a switch at the door. A gas fire should have a pilot jet. There should also be a regulating cock, and a gauge on the fire itself to show on a dial the rate of consumption per hour. I commend this suggestion to the consideration of manufacturers. Unless this is arranged, it is only rarely that the full advantage can be taken of the flexibility of a gas fire, which is its supreme virtue; without some such provision a gas fire costs a great deal more than it need cost.

The numerical results of these observations are shown in Tables V., V.A, and V.B.

FUEL COSTS.

The general conclusion drawn from the figures, taken over a long period of use, was that a gas fire is about 2·1 times as expensive as a coal fire in fuel alone, when it is continuously used, and an electric fire, when out in the room and not in the fireplace, is 1·57 times as expensive as a gas fire, all doing the same continuous duty for the same time. Electricity when used in these conditions would have to be sold at 0·6d. per unit to compete with a gas fire at 10d. per therm. It must not be overlooked that an electric radiator can be brought out into the room and a gas fire cannot.

When used, as it should be, in the second manner, in an occasionally occupied room—that is, by turning out when not required, and regulating to requirements—the cost of the gas fire *in fuel alone* was distinctly less than that of a small coal fire continuously burning in two of the rooms used in the conditions explained above. These figures apply only to what are probably a typical dining room and a typical drawing room respectively.

The dining room gas fire was found to cost about three-quarters of the cost of a coal fire under the conditions in which it is used in this household—that is, a small coal fire being maintained continuously and the gas fire only being lighted when required for meals.

The music room would hardly ever have had a fire at all if it had been necessary to light up a coal fire, as the panel warming is adequate for comfort, and the damage to the light coloured and expensive decorations, due to a coal fire, was not to be thought of. In such cases the advantage of a gas fire is very great, though a real practical comparison is impossible. If a coal fire were used in this room the cost would have been based on the observations made in the other rooms. The cost of fuel, however, is by no means the only cost of a fire.

Table V.—*Continuous Heating.*

[Cost of Coal, Gas, and Electric Fires in 3 rooms as sole heating in cold weather to 60° continuously for 24 hours.]

Name of Room.	Calculated Heat Required for 24 Hours.	Coal Fire.		Gas Fire.		Electric Fires.		Cost of—		
		Weight Used per 24 Hours.	B.Th.U. in Fuel.	C.Ft. Used per 24 Hours.	B.Th.U. in Gas.	Units Used.	B.Th.U. in Electric Units.	Coal per 24 Hours.	Gas per 24 Hours.	Electricity per 24 Hours.
								d.	d.	d.
Morning room	182,000	66	920,000	650	325,000	42	143,000	14·2	32·5	42
Drawing room	340,000	123	1,720,000	1047	523,000	92	314,000	26·5	52·4	92
Dining room	225,000	81	1,130,000	742	370,000	58	197,000*	17·4	37·2	58
				2439	1,218,000					
Cost mean of 3 rooms, p.ct.								47·5	100	157

Cost of coal equivalent to gas at 10d. per therm, 84s. per ton. Cost of electricity to gas at 10d. per therm, 0·63d.

* Lower figures due to more effective localization of the heater.

Table V.A.—*Showing Comparative Fuel Costs under Service Conditions of Coal, Gas, and Electric Fires for 6 Winter Months in 3 Rooms.*

Name of Room.	Coal Burned per Year.	Gas Burned per Year.		Electricity Units Used per Year.		Total Fuel Cost for 6 Months, Day Only.		
		Continuous (Day Only).	Intermittent.	Continuous.	Intermittent.	Coal.	Gas.	Electricity.
	Tons.	C.Ft.	C.Ft.			£	£	£
Morning	2·05	46,000	30,000	3050	2000	4·1	6·3	8·3
Drawing	3·1	64,000	18,800	4250	1260	6·2	3·9	5·21
Dining	1·8	38,500	14,400	2570	960	3·6	3·03	3·9
					Total £	13·9	13·28	17·48
					P.ct.	100	96	126

The above results apply to the particular conditions in which the rooms were actually used. They have not necessarily any general application, though they will probably apply to other rooms similarly used.

Table V B.—*Estimated Total Cost of Coal, Gas, and Electric Fires for 6 Months in One Living Room Continuously Occupied.*

	Coal.	Gas.	Electricity.
	£ s. d.	£ s. d.	£ s. d.
Fuel	4 2 0	9 14 9	12 12 0
Maid's labour—150 hours at 6d.	3 15 0		
Chimney scraping	0 5 0		
Maid's labour—cleaning after repairs, &c.	0 5 0		
	0 5 0	0 10 0	0 10 0
Extra redecoration—cost per annum*	2 0 0		
Total cost	£10 12 0	£10 4 0	£13 2 0

* Depends on character and frequency of redecoration considered necessary.

Labour.

The additional amount of labour involved in the use of each coal fire was calculated in this establishment at about 50 minutes per day of one maid's labour. The cost of this may be reckoned as about 5d. per day per fire, calculating the whole cost of one maid in wages, food, laundry, and sundries, as about £100 per annum. In addition, when the coal fire was on, the chimney had to be swept two or three times a year, at 2s. 6d. a time, involving the great disturbance which that operation, if performed in a cleanly manner, always produces —namely, the removal of all the movable furniture, and the covering up with dust sheets of the remainder, and the carpets. Each time the chimney is swept involved the maid in about 4 to 5 hours' work, which costs another 2s. 6d. The fouling of the decorations when the coal fire was used was also most marked. It was calculated that, using a coal fire, the room should be redecorated, at a cost of £5, every third year, while with a gas fire double this period would suffice.

Taking all these things into account, it was found that the gross cost of the gas was not notably greater than that of a coal fire. An attempt has been made in Table V.B to estimate the total cost.

General Observations on the Comparison of Coal, Gas, and Electric Fires.

The following observations represent the personal opinions of this household after these prolonged comparisons. Some of these comments are obvious ones. No particular originality is claimed for them.

Coal Fires Compared with Gas or Electric Ones.

The most salient difference is that the coal fire requires the carrying of coal and ashes, which neither the gas nor the electric fires do. An undesirable feature of a coal fire is that it often gives more heat than is required, which it is impossible to control otherwise than by letting the fire die down. Persons using these rooms found that the coal fire, though attractive in appearance, was often uncomfortably warm. If a gas or electric fire is found too hot at any time, it can always be turned low, or shut off, and the effect is immediate. When a coal fire is lighted it is at least an hour or more before it is of any actual advantage, and afterwards it is often too hot. With a gas or electric fire, on the other hand, five minutes after lighting it is as intense as required and can be regulated. A coal fire cannot, therefore, be rapidly brought into use. Gas or electric fires can be used as and when required, in what should be warm weather. There are always evenings in our eccentric summers which are so cold that a small fire is a great comfort, or luxury. It is not to be thought of to light a coal fire in a modest household, and so involve the maids in the work of clearing up, merely because a fire is desirable for (say) half-an-hour.

A coal fire causes a lot of labour, trouble, and expense owing to the dirt and smoke it produces. Both gas and electric fires have the very great advantage that they make no dirt or smoke.

One other important and fundamental difference which has a strong influence on the relative economy of a coal fire is that, while with a gas or electric fire waste is caused by negligence, on the other hand with a coal fire negligence induces economy.

A person can only waste coal by taking the trouble to pile on unnecessary amounts of coal—whereas he can waste gas or electricity by neglecting to turn them off when it is desirable to do so—as most people are negligent in such matters it follows that careless people, such as maidservants, should not be provided with gas or electric fires, but with coal ones—when people have to pay for the gas or electricity they are commonly careful in its use—those who have not to pay are usually careless and extravagant.

The one respect in which the coal fire is supreme, above any substitute for it, is that of appearance. There can, as it seems to me and to this household, be no comparison between the appearance of a coal fire and that of either a gas or electric one. My view has always been that in this respect there is a great field for future improvements. The ordinary type of gas fire is too fierce when turned up full, it is not pleasant to look upon, it hurts the eyes, and the regular shape of the heating elements is most inartistic. When it is turned down it has too much the appearance of a burnt out firework. There is no mystery about it.

There are electric fires on the market which are incomparably superior in appearance, and it is not easy for an outsider to see why the makers of gas fires should not produce something comparable in attractiveness of appearance to these.

The "Cinderella" type adopted in these experiments is so far superior in appearance to the ordinary type that it actually makes up the difference, in this case, between retaining the gas fire in the common room in regular use and using a coal fire instead. This type, though it is capable of improvement, at least does not hurt the eyes. It is cheerful in appearance, even when turned low. These opinions are only put forward as personal to this household.

Comparison of Gas and Electric Heaters.

In making a specific comparison between gas and electricity, it should not be lost sight of that the three outstanding advantages—and they are great advantages—of an electrical fire are: (1) Its portability, (2) the ease with which it can be switched on or off, and (3) the absence of products of combustion.

It can be safely moved from the fireplace into the centre of a room, in proximity to a person who desires its warmth, with no other connection to it than a flexible cord. Its localization renders it useful when of such a small power that a gas fire of the same power would be useless.

A gas fire, on the other hand, on account of its products of combustion, is necessarily fixed under a chimney flue in the fireplace where, however, it has an auxiliary advantage—and a great one—of accelerating the ventilation of the room, for which duty its products of combustion are a distinct advantage.

It is quite evident that any intelligent cost comparison must bear these essential differences in mind.

The electric heater gives off, perhaps 65 p.ct. of the energy used in the form of radiation, the remainder being emitted as convection, and the appliance having a real combined efficiency of 100 p.ct.

A gas fire, on the other hand, has a real radiant efficiency in the region of 50 p.ct., though many authorities put it much lower, with an additional convective effect which generally varies between 5 and 10 p.ct. of the total heat in the gas, giving a total real efficiency of (say) 57 p.ct.; the remainder of the heat being employed to secure the ventilation of the room—an invaluable function which is not served at all by an electric heater.

General Conclusion.

The general conclusion, as a consequence of these trials, was that in a house of this type, when used in this way, gas fires, if carefully used, fulfilled every purpose, including economy, cleanliness, and comfort, better than did either coal or electric fires. The solitary case of doubt was in the morning room, where a coal fire would be preferred, partly because of the superior appearance, and partly on the grounds of economy in winter. The consideration of economy would largely disappear if the fire had been capable of being switched off at the door, and had been provided with a pilot light, and had been more easy to control, turn off, and regulate than it was. Electric fires are also used for local and temporary purposes—visitors' bedrooms; sickness; the use of a bedroom for sewing or other purposes.

It has been impressed on my mind by this experience that the economical use of either a gas or an electric fire depends almost entirely on its careful use. They are frightfully extravagant if carelessly used continuously, and quite reasonably economical when carefully used. They will not be controlled in practice unless the control is easy. There is little time lag in an electric fire. The time lag of a gas fire is just sufficient to make the control inefficient. Even a careful user does not wish to be always tinkering with the control cock. For that reason some form of simple and inconspicuous gauge to indicate the current rate of consumption would be a great help to the intelligent and economic use of a gas fire. It is almost, but not quite, as important as a thermometer on an oven.

The most desirable arrangement for a room continuously used is to employ a coal fire during the winter, and substitute a "Cinderella" gas fire in the summer. The change-over can easily be effected in five or ten minutes.

SECTION IV.—HOT WATER SUPPLY.

It is necessary in this case also to describe exactly the conditions prevailing in this house, as the figures will only apply to a house of a similar character. In general terms the requirements here are that hot water should be available at any hour day or night, in quantity probably considerably greater than is usual in a house of this size. All the members of the household take one or more full hot baths daily, sometimes early in the morning, sometimes before dinner in the evening, or very late at night. The average number of times the bath is used varies from about 35 to 45 times per week. Three of these are regularly taken in the morning before breakfast, one being very early. Sometimes two or three are required in the evening, the remainder in the afternoon, especially during the hot days of summer, when sports are in progress. There is a hot shower bath which employs a great deal of hot water and is frequently used. In addition, in the lavatories, hot water was constantly used for hand washing purposes, the number of times of use being from 100 to 150 per week. The amount of hot water used for kitchen and house cleaning purposes is variable and uncertain. In these conditions evidently a constant supply of hot water is necessary.

Just as in the case of the heating, prolonged experiments were made with the house empty by drawing off measured quantities of hot water at stated times to correspond with the usual use of the baths in the house. This was done with both the coke and the gas fired boilers, the summer outfit being used for the purpose. The result in this case was that, when exactly identical conditions were maintained as between the coke and the gas fired boiler, the cost of the gas was about four times that of the coke.

Table VI.—*Particulars of Hot Water Supply Plant; there is also a Shower Bath in Constant Use.*

Fittings—
1 bath, 3 lavatory basins, 3 sinks.
Inhabitants—
4 residents, 2 maids, 1–2 occasional visitors.
Boilers—
1 Ideal Classic coke boiler operating indirectly on cylinder.
1 Potterton gas boiler operating directly on cylinder.
Storage—
1 100-gallon cylinder, 1 50-gallon closed tank (high level).
Pipes—
114 ft. of 1½-in. circulating pipe, coated.
1 coil in linen closet, 28 ft. of 2-in. pipe.
Hot towel rail, 15 ft. of 1-in. pipe, nickel plated.
40 ft. of 1-in. pipe round bathroom, uncoated.
10 ft. of ¾-in. pipe, uncoated.
53 ft. of ½-in. pipe, uncoated.
Coating—
Tanks and pipes all completely coated with asbestos paper and 1½ in. of sectional cork and asbestos, and canvas pasted over by Reid, McFarlane, & Co. Efficiency of coating, 94 p.ct.
Temperature controlled by thermostat to 140° Fahr.
Actual draw-off in use—
Minimum about 750,000 B.Th.U. per week.
Maximum about 1,000,000 B.Th.U. per week.
Average, 900,000 B.Th.U. per week.

Similar measurements were subsequently made with the house in occupation, the boilers being in charge of the maid. In this case the relative cost of the gas was a great deal reduced owing to the accurate thermostatic control and lack of time lag, and other causes. The proportion between the cost of the gas and the coke was found to be very similar to those already given in the case of the heating.

Results.

The amount of heat actually used as hot water varies from 750,000 to 1,000,000 B.Th.U. per week, corresponding to a total of 830 to 1100 gallons per week at 140°, or from 20 to 26 gallons per day per person.

In order to supply this the B.Th.U. expended in the fuel is approximately 3,000,000 B.Th.U. per week when coke is used, and approximately 1,750,000 B.Th.U. when gas is used.

Of these, in both cases, from 1,400,000 to 1,600,000 B.Th.U. is actually delivered to the water, the difference between these amounting to from 400,000 to 650,000 B.Th.U. per week, representing the amount lost in the linen airing closet and towel rails, &c., and through the coating, which, in this case, is exceptionally good, probably as good as can be obtained.

The proportionate loss in the usual hot water supply installation is very much greater than this. It is not unusual for the amount lost through the surfaces of the pipes, and the like, to be ten times that which is actually used as hot water.

In the present case the conditions were exceptionally economical in relation to the amount of hot water used, first because there is a relatively large and continuous use of hot water, and secondly that the installation is very well designed and fitted, with especial regard to economy, the insulation exceptionally good, and the temperature of the water is kept low by thermostat, rarely exceeding about 140°.

Measurements were taken in the following conditions. As the hot water used in the ordinary way during the winter was supplied from the main boilers, no separate measurements could be taken of the cost in fuel. During the summer, however, the special summer outfit was used, which was separately heated alternatively by coke or by gas. The efficiencies of both boilers were accurately known and the fuel used accurately measured.

A comparison was made between these by weighing the solid fuel and measuring by special meter the amount of gas used per week. In these conditions the cost of the gas heated supply was found to be 3¼ times that of the coke heated supply, one being 175d. per week, and the other 54d.

The heat lost by the hot closet, towel airers, and through the coating was ascertained when the house was empty, by maintaining the water at 140° for a week without drawing off any hot water, and measuring the amount of gas used. This pointed to a loss of about 400,000 B.Th.U.

The amount of time spent by the maid and gardener daily, when coke is used, in carrying fuel and cleaning up, was about 25 minutes per day; the cost of this time, however, does not

Table VII.—*Hot Water Service.*

[Test with House Unoccupied. Water Drawn Off Measured.]

Fuel.	Quantity of Fuel Burnt per Week.	B.Th.U. in Fuel.	B.Th.U. Transmitted to Water.	B.Th.U. in Hot Water Actually Drawn Off.	Difference Represents Loss from Pipes, &c.	Efficiency of Boiler. P.Ct.	Efficiency of Use. Fuel to Water Used. P.Ct.	Cost per Week.	Percentage.	
								d.		
Gas continuous	1020 c.ft.	510,000	401,000	0	401,000	80	0	51	..	..
Coke banked during night . .	308 lbs.	3,750,000	2,060,000	1,430,000	630,000	55	38	66	100	32
Gas off during night	4123 c.ft.	2,060,000	1,660,000	1,480,000	180,000	80	72	206	313	100
Electricity calculated 100 p.ct. efficiency off during night. .	476 units	1,630,000	1,630,000	1,450,000	180,000	100	90	476	725	231

TABLE VIII.—*Hot Water Service. Actual Use.*

Fuel.	Average Quantity of Fuel Burnt per Week.	B.Th.U. in Fuel Burnt per Week.	B.Th.U. Transmitted to Water per Week.	B.Th.U. in Water Drawn off per Week.	Difference Represents Loss from Pipes per Week.	Efficiency of Boiler. P.Ct.	Efficiency of Use. P.Ct.	Cost per Week.	Percentage.	
								d.		
Coke	250 lbs.	3,050,000	1,660,000	750,000 to 1,000,000	900,000 to 600,000	55	24·7–33·0	53·5	100	30·5
Gas	3500 c.ft.	1,750,000	1,400,000	750,000 to 1,000,000	650,000 to 400,000	80	42·8–57·0	175	328	100
Electricity (calculated most favourable condition)	410 units	1,400,000	1,400,000	750,000 to 1,000,000	650,000 to 400,000	100	53·5–72·0	410	770	235

Electricity would have to be sold at 0·425d. per unit to compete with gas at 10d. per therm.

compensate for the extra cost of gas. It may be taken, therefore, that, though the gas-heated supply is more convenient and much cleaner, its use cannot be justified on the grounds of economy in a circulating system of this type used in these conditions.

The comparison with electricity at 1d. per unit shows that the number of units per week which would have been used for the same supply, under the same conditions, at 100 p.ct. efficiency, would have been 410d., or 2·35 times the cost of gas. The actual efficiency would have been something less than 100 p.ct. Electrical energy would have to be sold at about 0·4d. per unit to compete with gas at 10d. per therm, and 0·125d. to compete with coke in the same conditions. It must be stated, however, that electrical power would be superior to gas or coke in safety and in convenience.

The economical use of gas for the hot water supply in a private house, in comparison with other methods, depends almost entirely on the method of use and the amount of hot water required. Where the use is small and occasional only, a locally fitted gas plant is certainly more economical than any other method. A geyser is a device which I personally look on askance. If improperly fixed or if there are children it may be very dangerous. In any case, to wait for it to fill a hot bath is an exasperating experience. A storage system is much to be preferred.

Some such device as the "Sunhot," for instance, where a small gas jet is continually in use for warming up gradually a considerable mass of water well insulated, which is used in a gulp when a bath is taken, may be extremely economical. This device, combined with local instantaneous gas heaters for a small house, is ideal, both for cheapness of installation and for economy; but such an outfit would be no use in a house with large and constant requirements—such as the one described. In that case a coke-fired boiler is by far cheaper than anything else.

The most important observation in connection with this type of installation is that the coating of every part of the hot water supply system should be as good as it can be made. It is far more economical to put on an expensive and efficient coating than a cheap one. No part of the hot pipes should be left uncovered.

It is easy to calculate that, in the case of a gas-heated hot water supply, every foot of uncovered pipe, (say) 1¼ in. diameter, kept hot day and night through a whole year costs the consumer 1800 c.ft. of gas, or about 7s. 6d. per annum.

The simple explanation accounts for the fact that many people who instal gas-heated hot water supplies disuse them after a few quarters' use, when they find the frightful cost of the gas. It has always seemed to me that the gas industry should impress this fact on their customers very strongly, even to the extent of refusing to put in a gas heated supply unless it is properly installed. To do anything else gives gas a bad name for extravagance.

(*To be concluded.*)

High-Pressure Distribution of Gas.

By F. W. SANSOM, of Exeter.

[From a Paper before the Western Junior Gas Association, Feb. 15.]

Of recent years there has been a steady but rapidly increasing tendency for the population of our towns and cities to move to the outskirts; and in consequence we find large residential suburbs growing round our towns, with an accompanying transference of the area of highest consumption outwards.

If, when the trunk mains were laid, they had been of adequate size for modern consumption, then it would only mean an extension of these large mains to cope with the new conditions. Unfortunately, in most cases, it is found that the development of new residential districts is taking place where the existing gas mains are perhaps barely capable of carrying their present load.

Even if this transference of the area of highest consumption has not taken place, it may be found that, in consequence of the much larger use of gas in recent times, the existing mains are incapable of maintaining an adequate pressure on the outskirts of the district.

Both these conditions are capable of three methods of solution:

(1) By increasing the size of the existing trunk mains.
(2) By increasing the initial pressure on the existing trunk mains, by means of boosters.
(3) By feeding the mains in an area of poor supply with gas from a high-pressure main by means of governors—in an ideal case there would be a high-pressure main encircling the whole district, gas being fed into the low-pressure mains at several points.

Let us examine these methods in detail and weigh up the merits and demerits of each, taking the low-pressure method first. In its favour is the fact that no new plant will be required at the works, but against this must be considered the probable heavy expense entailed in laying a large trunk main through what is now probably a very busy and perhaps congested part of the town. Also, if the low-pressure method is to be used, it is essential that allowance be made for future development, necessitating the laying of larger mains than are at the moment required, with a consequent serious "burying of capital."

The boosting method has in its favour the fact that no new mains are required; but it has as a very great disadvantage—the use of excessive pressure in some parts of the district in order to maintain an adequate pressure in one or two areas where the mains are overtaxed.

The high-pressure method has much to recommend it, the outstanding advantages being:

(1) The new mains required will be small, and probably of steel tube, which mains will be considerably cheaper to lay than low-pressure trunk mains of large diameter, even when allowance is made for future development.
(2) The pressure can be augmented exactly at the points required without raising the pressure over the whole district, gas being admitted to the low-pressure mains only when it is needed for the maintenance of pressure, the governors connecting the high and low pressure mains shutting-off the supply during periods of low consumption.
(3) The high-pressure method, when once installed, will prove capable of meeting very much heavier consumption by the simple expedient of raising the pressure.

The high-pressure method has as an apparent disadvantage—the necessity of providing pumping machinery at the works. In practice, it is found that the cost of compressing is low, and is more than counterbalanced by the saving in cost of the larger mains which would otherwise be required.

HIGH-PRESSURE SYSTEM AT EXETER.

Our high-pressure system has several functions to perform. First, it is used for the transmission of gas to districts of supply situated a considerable distance from the manufacturing station; Topsham being 4½ miles, Pinhoe 6½ miles, and Broadclyst 9½ miles from our Basin Gas-Works. The advantages of high pressure for this work include:

(1) The carrying capacity of a given size main is much greater with high pressures than with low pressures.
(2) To transmit a given quantity of gas for a given distance, the initial cost of high-pressure mains is much less than

that of low-pressure mains, on account of the much smaller main required.

(3) The transmission of gas by high pressure is very elastic, for greatly increased discharges can be obtained simply by raising the initial pressure.

Secondly, our high-pressure system is used to reinforce the pressure in the low-pressure mains at several points.

Thirdly, there is the supplying of isolated consumers with gas direct from a high-pressure main. In many cases the business of supplying such consumers would not be profitable were it necessary to employ low-pressure mains to do so. By the use of high pressure, however, much smaller mains will suffice, and the business is turned into a source of profit.

HIGH-PRESSURE PLANT AT EXETER.

The compressing plant at the works consists of two reciprocating compressors driven by compound steam engines, each compressor being capable of passing 120,000 c.ft. per hour against a pressure of 35 lbs. per sq. in. at 120 r.p.m. From the compressors the gas passes into a cylindrical steel receiver, and then leaves the works through a 10-in. welded steel main, the pressure at the present time ranging between 7 lbs. per sq. in. during the night to 14 lbs. per sq. in. during the peak load.

Two governors are fed from the main—one set to give an outlet pressure of 25 in. of water, which feeds an intermediate pressure system; the other set at 33 in. of water outlet pressure, feeding another intermediate pressure system.

Regarding the governors which we have in use, they are principally of the Reynolds type, and are situated in houses above ground, or in underground chambers, according to local conditions. All the important governors are in duplicate, being changed-over fortnightly and completely overhauled every three months. All governors have at the inlet a cast-iron dust box, fitted with three wire gauze screens; but we have so far only been troubled with dust in a 4-inch high-pressure main which has been in use since 1914.

RUNNING SERVICES FROM HIGH-PRESSURE MAIN.

This presents no special difficulty. The apparatus used for drilling the main is fundamentally similar to that used for drilling low-pressure mains, except that at the bottom of the barrel there is a machined steel slide which, when shut, is gas-tight under high pressure. The method of using this apparatus is as follows:

The drilling gear is clamped to the main in the usual manner and the main is drilled and tapped in one operation, using a combined tool. When this operation is completed the tool is unscrewed from the main, the drum drawn to the top of the barrel, and the slide is shut. The drum, complete with the drill and tap, is then taken out, and the drill is unscrewed from the drum and replaced by an adaptor into which is screwed an expansion nipple which has been assembled on the taper mandrel, by means of which it is to be expanded in the main. The drum is replaced in the barrel of the machine, the slide withdrawn, and the nipple screwed into the hole already tapped in the main.

The main casting of the apparatus is removed, since the taper mandrel inside the expansion nipple prevents the escape of gas. The drum and adaptor are unscrewed from the nipple, a high-pressure straight through cock is screwed on to the top of the nipple, and the outer sleeve of the expanding mandrel is screwed into the top of the cock. The nipple is expanded in the usual manner by screwing-down the nut on the mandrel spindle, thus drawing the mandrel up through the nipple. When the mandrel is through the nipple it is forced to the top of the outer sleeve by the pressure of the gas, the cock is shut, and the mandrel sleeve is unscrewed, when the service may be laid at leisure. Over the high-pressure cock, which of necessity must be left screwed on to the expansion nipple, it is our custom to fix a surface box, so that the cock can be shut at any time, if it is found necessary to do so.

In laying these high-pressure services, we use malleable iron fittings, as we find there is a tendency for ordinary steam sockets to open up if screwed very tightly, with the consequent risk of leaks developing. So far we have had no trouble in this direction with the malleable fittings. At the meter end of the service, we fit a high-pressure gland cock, a service governor complete with mercury safety seal, and the usual lead inlet connection to the meter.

LAYING HIGH-PRESSURE MAINS.

In regard to the mains used for the transmission of gas at high pressure, those at Exeter are of steel tube, having inserted welded joints. When laying these mains, we normally employ a large gang of labourers—in practice we find that a good welder can keep up with from 60 to 80 labourers, according to the type of soil to be excavated.

The trench is excavated as for any low-pressure main, having regard to depth, falls, and syphons, though opinions differ concerning the necessity for syphons after the first mile of main. Up to the present, we have not obtained any condensate beyond this distance.

On a straight run of main having no branches or valves, no joint holes are necessary, the pipes being socketed and supported immediately over the trench on wooden struts about 3 ft. 6 in. long, cut from 4 in. by 3 in. deal. The joints are then welded, and, when a considerable length has been joined up, the supports are removed one at a time from the starting-point, and the main is allowed to sag down into the trench, being controlled by ropes. The last two or three supports are left, and fresh tubes are socketed-up on supports, and the process is repeated.

It is possible to get round ordinary curves in the road without the use of specials by jointing-up sufficient tubes and pulling the pipe round cold. In more severe cases the pipes can be bent considerably if heated at the point of bending by means of the welder's torch.

It is our custom to insert valves at intervals of about half or three-quarters of a mile, and we also test the main for soundness in sections to these points. On to the last socket is welded a circular steel plate to the centre of which is welded a 1-in. steam socket. Into this socket is screwed a space nipple, carrying a 1-in. tee, attached to the branch of which is a pressure gauge reading to 120 lbs. per sq. in. The main is pumped up to a pressure of 100 lbs. per sq. in. by means of a portable air compressor (which is also useful for breaking up the crust of hard roads and for ramming back the earth when filling-in, if suitable pneumatic tools are available).

The main, after being pumped up to 100 lbs. per sq. in., has to pass two tests before being counted as sound:

(1) It has to stand for twelve hours without loss of pressure after making corrections for temperature changes.

(2) If it passes this test, every joint is tested by means of a brush and soapy water, small hand holes being excavated round each joint for this purpose.

When a section of main has passed both these tests, the joints are wrapped with jute cloth and well coated with hot pitch, the trench then being filled in.

Discussion.

Mr. J. T. SPENCER (President), in opening the discussion, asked whether the butt-weld joint had been used in place of the long-sleeve rigid joint. Was 3-in. outlet pressure of the governors sufficient for the areas of supply mentioned? Were the underground governor pits ventilated? The speaker had stated that one welder could keep sixty men employed. This figure appeared high.

Mr. W. WESTLAKE (Exeter) stated that the existing system of distribution was one which would efficiently deal with future extensions; the principle being a ring high-pressure system enclosing the area, which would develop in the future. District mains could thus radiate inwards, connecting with those outwards from the works. As in most old cities, great trouble was experienced when excavating in laying new mains from the works through the old portion. The streets were practically full of underground chambers, old drains, water mains, and electric cables. Naturally, large low-pressure mains would be out of the question.

Mr. S. JONES (Clevedon) asked what type of contract the Company had with the welder. Was the efficiency of the governors doubted, since they were inspected every three months? Valves were inserted every ¾ miles; were these left in after testing the main, or removed?

Mr. D. L. COPP (Exeter) stated that the valve system proved extremely useful. By boosting-up the pressure, the section of main which might need repairing could be isolated, and work carried out with very little interference to the system.

Mr. G. GUNSTON (Bristol) stated that, in the place of many of the valves, plates could be welded on the end of the section under test, which, when completed, could be cut off, and work carried on. Could not diaphragm regulators be used in place of the Reynolds type of governor? Though the regulators allowed a certain slight leakage or banking-up of pressure on a dead-end system, where there was no consumption, the saving in the initial cost, size of governor pit, and maintenance charges would be material.

THE AUTHOR'S REPLY.

Mr. SANSOM, in reply, stated that at Exeter they had always used the long-sleeve welded joint. The 3-in. outlet pressure was quite sufficient for existing demands. No special ventilation was provided from the inside of the governor pits, but the covers over the whole of the pit could be removed, and the latter left open for a short time before a man entered it. The welder, in an ordinary day's work, would do approximately twenty 6-in. joints, which would entail about 200 yards of ground to be opened and filled. The welder was paid so much per joint, and so much per hour for waiting time. The valves were inserted for the isolation of the main, when completed, and they were kept in working order by forced lubrication. As for other types of governors, those existing had proved satisfactory; and their slogan was "Safety first at all cost."

VOTE OF THANKS.

Mr. B. F. HARRIS (Trowbridge) proposed, and Mr. W. J. HURN (Clevedon) seconded, a vote of thanks to the speaker, which was unanimously carried; and Mr. SANSOM suitably replied.

Mr. David Muir Addresses Wales and Monmouthshire Juniors.

Following an inspection of a new gasholder at the Pontypridd Gas-Works, on Jan. 23, members of the Wales and Monmouthshire Junior Gas Association were addressed by Mr. David Muir, Engineer and Manager. He said: You have this afternoon had an opportunity of inspecting the work, as far as it has proceeded, of the erection of a half-million spiral-guided holder at our Pontypridd Station. The original holder, which has been demolished to make room for the holder in course of erection, was a column-guided one of a capacity of 90,000 c.ft., and had been in use for 65 years. This holder was a two-lift one made of wrought-iron plates, the tank being of cast iron. The plates had gone very bad in places, and, further, the holder was not capable of maintaining a sufficient pressure in our outlying districts, and was too small. During the last ten years the output of gas has increased by 45½ million c.ft., or 38½ p.ct.; 1466 additional consumers have been connected to our mains; and an additional 1563 cookers, 1192 fires, 915 boilers, and 542 irons have been put in commission by our consumers. Further, our maximum day's output has increased from 520,000 c.ft. to 717,000 c.ft. Thus you will realize the necessity of having better storage and sufficiency of pressure.

This new holder, with the holders at our Treforest Works, will give a storage capacity of just over 1 million c.ft. The question may arise in your minds as to why boosting was not adopted, instead of going to the expense of a new holder. As this is a mining area, and subsidence is our bugbear, resulting in broken mains, drawn joints, and services, you will understand why boosting was eliminated. After careful consideration, it was decided to erect a spiral-guided holder of a half-million c.ft. capacity in a steel tank, and at the same time to instal two 18-in. district governors.

The foundations of the old tank were mass concrete 7 ft. below ground-level, and it was decided to incorporate this in the new foundations. This was done by constructing a mass concrete raft 18 in. thick round it, to make a level slab 97 ft. in diameter. A reinforced concrete raft 12 in. thick by 97 ft. diameter was made to cover the whole of the old foundations and the new mass concrete, the reinforced concrete raft having a rise of 3 in. in the centre. As the foundations had to be constructed very close to existing buildings and boundary walls, it was necessary to provide mass concrete retaining walls to support these before excavating for the foundation.

The steel tank for the holder is 95 ft. in diameter by 25 ft. deep. The bottom plates are ¼ in. thick, except those through which the inlet and outlet pipes pass, and these are ⅜ in. thick. The bottom strake of plates is secured to the bottom plates of the tank by means of an angle curb 4½ in. by 4½ in. by ⅝ in. There are five tiers of side plates arranged one tier in, and one tier out alternately with the vertical seams of the two lower tiers, having treble-riveted lap joints. The remaining vertical seams have double-riveted lap joints. All horizontal seams are single-riveted lap joints. The holder will have three lifts.

The two 18-in. station governors will be Peebles safety station type complete with double-balanced gunmetal valves arranged with a counterbalance and loaded by weight of water on top of the bell, with by-passes for each governor consisting of three 18-in. rack and pinion valves, with necessary flange connecting pipes, indicating columns, and hand wheel.

The work you have seen in hand is being carried out by Messrs. Broadhead Constructions, Ltd., of Manchester.

Sales Methods at Pontypridd.

In an area such as we have in Pontypridd, it is no easy matter to gain ground with cookers, fires, &c., as a large number of our consumers are engaged in the coal industry and enjoy the benefit of cheap coal. A factor which has also mitigated against development has been the fact that in the last ten years, during which period I have been at Pontypridd, there have been two stoppages in the coal industry, followed by an aftermath which has made our area a distressed one.

The first thing to be tackled was mains and services. This meant the enlarging of mains and the renewal of services to enable the consumers to have a good supply of gas. Attention was then directed to meters, and a gradual process of discarding the smaller ones and substituting those of larger capacity has been pursued. A survey of the cookers in use revealed the fact that a great many obsolete models were on the district, resulting in their non-use, or, if they happened to be employed, a dissatisfied customer. These have been systematically replaced by up-to-date cookers.

A factor which was looked into to assist in the development of sales was the price of gas. Ten years ago the price was 5s. 6d. per 1000 c.ft. for all purposes. This has been reduced to 4s. 4d., with a graduated scale according to consumption down to 3s. 8d. per 1000 c.ft.; for public lighting to 3s. per 1000 c.ft.; and for large industrial consumption to 1s. per 1000 c.ft.

The price having been reduced to enable the consumers to use gas more freely, it was necessary to tackle the sales side of the business. A gas exhibition was held which greatly stimulated the sale of appliances. However, due to the depressed state of trade in the town, and the number of workpeople only partially employed, it was found that a great many consumers could not afford to purchase appliances such as fires, boilers, &c. To assist these people, and still develop our business, a hire-purchase system was brought into operation. Unfortunately, with the closing-down of the collieries, even more people were thrown idle, and their financial position became still worse. To cope with this situation, it was decided to inaugurate a simple hire scheme for fires and boilers and irons, the hire in most cases being kept from the rebate to our slot consumers. This has enabled us to increase the number of appliances in use, and thereby our consumption.

Attention has been given to street lighting, to keep it well in the forefront, as this is always a good advertisement. Special attention has been focussed on consumers' burners, and the Gas Department sell an aluminium burner, complete with mantle and globe, for the small sum of 2s. 4d. I may say that for the last six years we have sold twelve gross of burners per annum.

Notwithstanding the work carried out during the last ten years, the Gas Department is in a sound financial position. During the last three months £2500 has been appropriated from the Department to assist rating schemes. I think the foregoing proves that, if service is given to the consumers, the gas industry will forge ahead, notwithstanding the competition of electricity.

Discussion.

Mr. C. S. Thane (Newport) inquired as to the thickness of the bottom plates of the holder, remarking that they seemed slight in comparison with the side plates used.

Mr. A. C. Prankard (Cardiff) asked what was the method employed to test for soundness after completion of the holder.

Mr. J. Mogford thanked Mr. Muir for the opportunity of viewing the holder. He mentioned that he had made arrangements for the students of his engineering class to attend that afternoon, and he was sure that the visit had proved interesting to them. Mr. Muir was doing excellent service among the Juniors, and also for the Salesmen's Circle, being Chairman of the latter organization. Mr. Mogford remarked on the excellent administration of the undertaking at Pontypridd, where everything possible was being done in a very depressed area for the relief of the rates in the town.

Mr. J. Stephenson (Aberdare) wondered whether there would be any trouble with subsidence in the future. He took it that there was not sufficient space to put down a column-guided holder.

Mr. T. Smith (Cardiff) asked the author if any difficulty was experienced in keeping up the supply during peak loads while the construction of the holder was taking place. Referring to the price charged for gas for industrial purposes, did this include fish ranges? He also would like to know if there was a free maintenance scheme in operation.

Mr. D. Muir (Pontypridd) said he was very pleased to have the Juniors at Pontypridd, and extended a further invitation to them to see the holder at a later stage when the crown had been put on. Referring to some of the points raised, he said they had managed to keep up an adequate supply to the consumers during the construction of the new holder. Regarding the price of gas charged for fish ranges, this was at the ordinary rate of 3s. 8d. per 1000 c.ft. The bulk of the gas used in their district was by prepayment consumers. He would say, therefore, that free attention was given to consumers' fittings and appliances. A good consumption was being maintained by the use of appliances issued under a simple-hire scheme.

Mr. R. W. Broadhead, of Messrs. Broadhead Constructions, Ltd., contractors for the work, thanked the President for inviting him to their meeting. He was pleased to say that good relations existed between the contractors and the Resident Engineer, and this made for very smooth working. With Mr. Muir's permission, he would like to touch on some points in connection with the construction of the holder. In the first place, he pointed out that it was not a matter of space altogether that a spiral-guided holder was being erected, the reason being that a column-guided holder worked out in cost at 8 to 10 p.ct. more; also, he considered that this type of holder was not quite so strong. He had found that iron plates stood very well for 50 to 60 years. The steel employed to-day was of much better substance than hitherto, and, in the work undertaken, heavy 10-gauge steel sheets were being used. He pointed out that a good foundation of concrete forming the base had been made; and, referring to the bottom plates, he observed that these were rarely more than ¼ in. in thickness, even in the biggest holders. He went on to explain the method of testing by air for soundness. He also mentioned that the carriages would be of good sound design.

A vote of thanks to Mr. Muir was proposed by Mr. C. B. Felton, and seconded by Mr. A. J. Cruise.

Mr. H. S. Bartlett proposed, and Mr. S. E. Brett seconded, a vote of thanks to the Pontypridd Urban District Council for the facilities afforded.

Boosting Pressures for Outlying Districts.

By C. E. HOLT, of the City of Birmingham Gas Department.

[From a Paper before the Midland Junior Gas Association, Feb. 20.]

With the rapid growth of a large city there is an ever-increasing demand for gas, particularly from new districts continually springing up on its outskirts. The pressures necessary for the efficient working of modern apparatus are higher than were formerly required, and it is important that an adequate supply of gas shall be available for all purposes. The efficiency of atmospheric burners, which comprise the bulk of gas consuming appliances, depends largely upon their being supplied with gas at constant pressure. If the pressure is varied the proportions of gas and air, and consequently the flame temperature, are altered.

General complaints of insufficiency of supply in an outlying district are probably due to the inadequacy of the size of main for the work it has to do. The simple plan of fixing portable pressure registers at two or three points in a district where shortness of pressure is complained of will prove whether complaints are well founded. A record of pressures is obtained not only for the whole of the day, but more particularly for the period when supplies could very well be improved. As mains are lengthened, and more gas is drawn off by additional consumers, pressures will fall owing to the friction loss along the pipes supplying the districts concerned. Existing mains will suffice to supply the necessary quantity of gas required at any period of the day, if the initial pressures can be raised accordingly, in order to allow for the additional friction loss caused by the increased velocity of flow. But to raise initial pressures necessary to give an adequate supply of gas for outlying districts would necessitate a general use of service governors for consumers massed in the large area several miles in all directions from the gas-works.

To cope with developments which have taken place over areas where the demand for gas has exceeded the capacity of the mains originally installed, it is more economical to lay a high-pressure feeder main to these districts to reinforce the low-pressure distribution system at selected points, rather than increase the number and size of the existing low-pressure mains.

In a high-pressure distributing scheme, in which a main conveying gas under a pressure of about 15 lbs. connects with a system of ordinary low-pressure mains, a special governor is required to reduce the pressure to that required on the district. There are three governor houses in Birmingham at the present time, each containing duplicate Bryan-Donkin Reynold type governors, with 12-in. high-pressure inlet and 24-in. low-pressure outlet. They are situated at Wake Green, Kings Norton, and Harborne, on the south-east, south, and south-west side of the city, about 4½, 5½, and 4½ miles respectively from the works. There is a 12-in. steel main laid to Wake Green, and a 9-in. steel main to Harborne, and both these are taken from a 12-in. cast-iron main supplying Kings Norton. Though one governor is in use in each house at the same time, it is advisable to change over fairly frequently, and it is usual to overhaul each governor thoroughly about every six months. With this type of governor the gas is governed down in two stages from the inlet pressure of 15 lbs. to 5 tenths above district pressure, and then to the district pressure in inches of water. The primary, or main, governor, and the secondary, or district, governor, are fitted with double valves, each pair having a total area equal to the size of inlet or outlet. The smaller the valves, particularly in the main governor, the easier it is to close against the high pressure at minimum or no consumption. Any obstruction on the seatings, even fine dust, makes it possible for gas to creep through. The size of the valves will depend upon the maximum quantity of gas passing per hour and the lowest differential pressure in inches of water. As the differential pressure at the period of greatest consumption sometimes falls as low as 3 in. W.G., the size of the valves must be arranged accordingly.

The arrangement of secondary valves and governors is called the auxiliary system, supplied direct by means of a pipe from the inlet side of the main high-pressure valve, and deals with small quantities of gas only.

HIGH-PRESSURE MAINS.

Valves are fixed at intervals of about half-a-mile, and should be tested and oiled periodically to ensure they are in working order. They should not be closed completely when the system is in use; it is known how many turns are necessary to close a valve, and one can partially close a valve without seriously interfering with the pressure. Valves should not be tested during the heavy load. If it should be necessary completely to close a valve during even a very light load, the governor house attendant should be advised beforehand. This can be quickly accomplished, as each governor house is provided with the telephone.

When carrying out any work on low-pressure mains in close proximity to the governor house, which necessitates bagging-off, with holes large enough to require bag-hole plates, the bagging-off should be done if possible before or after the period of heavy load. If the governor is in use, the attendant should be advised beforehand of the time for inserting and taking out bags.

When there are two or three mains radiating from a governor house, it is possible that a main travelling inwards, which is probably used for industrial as well as domestic purposes, and which is influenced by pressures from the works, can possibly manage without reinforcement during the heavy cooking load on Sundays. If a valve is inserted in this particular main near the governor house, it can be closed on Sunday mornings and re-opened after cooking time, in order that districts further out, where reinforcement is really required, may enjoy an improved supply.

If there is a considerable gap with few or no consumers between the governor house and the district in need, the pressure can be raised in this portion of main and governed down again where convenient. If an existing main can be made to cope with an increasing gas demand by raising the pressure, it is probably more economical than laying a larger main, particularly if the future development of this district is rather doubtful.

The pressure at the outlet of the district governor being as high as it is convenient to keep it, the pressure must be increased in the main supplying the district in need of reinforcement without raising the pressure in the various districts for which the district governor is used.

WORK IN THE BIRMINGHAM AREA.

From a 12-in. main near the Harborne governor house there is a 6-in. main running outwards for about ¾ mile, followed by a 4-in. main to Bartley Green and Woodgate, a total distance of about 2½ miles. The dwellings end at a point I will call A, which is about 300 yards from the governor house. From point A, for a further distance of about one mile to point B, where the dwellings commence again, are only two cottages and the public lamps. The best point to reinforce the supply is at A, and the most convenient point to govern down to the necessary pressures to suit requirements is at B, which, of course, necessitates the provision of service governors at the cottage meters, and governors at the public lamp burners. A Bryan-Donkin governor with high-pressure inlet and 4-in. low pressure outlet was fixed in the governor house, from which a 4-in. cast-iron main was laid to point A, and there connected to the existing main. The high-pressure governor is of the diaphragm type with double valves, the diaphragm being loaded direct by means of weights on the spindle carrier.

The high-pressure governor is loaded to give pressures varying at different periods of the day from 6 in. to 10 in. head of water, while at the outlet side of the mercurial governor the pressure is maintained at about 45 tenths. This governor, together with weekly inlet and outlet pressure recorders, is fixed in a brick chamber above ground at the back of the footpath.

RAISING PRESSURES BY INDUCTION.

There are districts towards which high-pressure mains have not been laid, and this necessitates the introduction of some apparatus at selected points to bring about the desired results. If it is not convenient at the charging end to push the gas any more, the motion can be accelerated by giving the gas a pull, with the result that a greater discharge is obtained without raising the initial pressure. Increasing consumption, and an increased velocity of flow, will tend to reduce inlet pressures, so that more gas can be sent from the works, and an improved outlet pressure obtained at the original initial pressure. To obtain this pull, some kind of centrifugal fan type booster can be employed to raise the pressure to a moderate degree.

On the east side of Birmingham, from a 10-in. main about five miles from the works, is an 8-in. main continuing for a further distance of about two miles to Marston Green. Owing to the growth of this district, the pressure at cooking time on Sundays, before pressure raising apparatus was introduced, dropped as low as 10 tenths. At a convenient position near the commencement of the 10-in. main, a Bryan-Donkin portable boosting plant has been fixed for the time being, to boost pressures when required. The "convenient position" is about half-a-mile from an 18-in. main from which the 10-in. main is supplied.

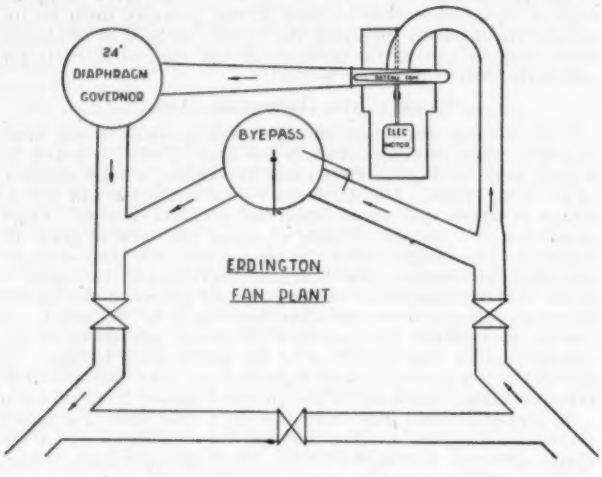
If the plant had been fixed near the district in need, the consumers beyond the fan would simply benefit at the expense of the consumers off the 8-in. main approaching the fan, the gas at maximum demand gradually passing from pressure to vacuum.

The fan, the blades of which are curved forward, is driven by a 1½-H.P. gas engine, and the increase of pressure is regulated

with exactness by a 6-in. governor at the outlet, the amount of the increase varying according to the time of day and season of the year. The governor is of the diaphragm type with double valves, and is adjusted by means of weights on the spindle carrier. A 6-in. counterpoise flap valve is included in the plant, which will close when the fan is set in motion, but which will allow gas to pass by in case of mischance. When the machine is not in use, the flap would swing away from its seating by means of the balance weight. The normal speed of the fan is 2000 r.p.m., and the apparatus is capable of dealing with 25,000 c.ft. of gas per hour against a pressure difference of 4 in. The inlet and outlet of boosting plant are both 10 in., and valves are fixed in order to isolate the apparatus when not in use or for repairs.

There is also a valve in the existing 10-in. main between the branches to and from the plant. At the commencement of period of maximum demand, the inlet and outlet valves are opened, the fan is set in motion, and the main valve is closed. If the main valve is not closed, which means that the machine is short circuited, no compression work is done, and, as the power absorbed by a fan is proportional to the amount of gas passed, the whole of the power is absorbed in circulating a large volume of gas through the blower, so engendering heavy suction, friction, and shock losses without any useful work. In addition to two water gauges at the plant, there are inlet and outlet pressure recorders fixed in an adjoining hut.

The pressure-raiser just described is a compact device, with a small fan, but is suitable for the time being for the purpose for which it is intended. For districts more thickly populated, and where the mains are much larger, some apparatus is required on a larger scale for dealing with an increased volume of gas.

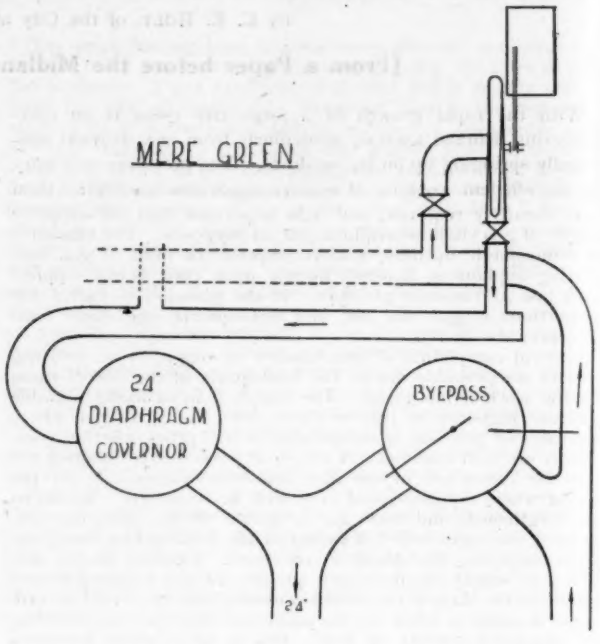


At Erdington on the north-east side of Birmingham, about four miles from the works, a Rateau fan has been installed, driven by a 5-B.H.P. electric motor, to which it is directly coupled. It is used for raising pressures in a 24-in. main. The fan is capable of passing 150,000 c.ft. of gas per hour against a pressure difference of 4 in. A 24-in. diaphragm governor with double valves is fixed at the outlet of the fan, and is gradually loaded by weights on the spindle carrier at the commencement of, and up to the time of, maximum consumption. This type of governor is suitable for use with medium pressures where the gas is boosted during the period of heavy demand, and it is necessary to reduce the pressure to that required on the district.

From the inlet side of fan to the outlet side governor just mentioned, a 24-in. by-pass is included, at the centre of which a by-pass governor of equal size is inserted. When the fan is set in motion, this by-pass governor is closed by hand, and will automatically remain closed so long as the pressure at its outlet is in excess of the pressure at its inlet. It will automatically open when the pressures are equal. Unlike all others previously mentioned, this governor has gas also at top side of diaphragm, supplied by means of a tube from the inlet side of the fan.

The inlet and outlet valves to and from the fan plant are, of course, kept open, while the main valve, round which the gas is passed to the fan, is kept closed. These valves are only used when it is necessary to overhaul the plant. The space occupied by the apparatus is small, the whole being fitted in what was once a small tramway waiting room. Daily pressure recorders are fixed from the inlet of the fan and the outlet of the governor. The plant was supplied by the Bryan Donkin Company, Ltd., of Chesterfield.

A fan plant, with 18-in. inlet and 24-in. outlet, governors, and valves, and arranged in a somewhat similar manner to the plant just described, is in use at Mere Green on the north side of Birmingham, about nine miles from the works. The fan, the blades of which are curved forward, was supplied by the James Keith & Blackman Company, Ltd., and is specified to handle 110,000 c.ft. of gas per hour, giving an added pressure of 14 in. total water gauge between inlet and outlet when running at 1700 r.p.m. The fan is driven by a 9½-H.P. gas engine.



If the increased flow of gas in a main from which gas is drawn seriously reduces the pressure in a portion of it, it may be necessary to isolate the main for a certain distance. Though the inlet to this plant is an 18-in. main, laid for future requirements, the gas is actually drawn from a 12-in. main; and, for this reason, and the long distance from the works, the fan at the peak load on Sundays will induce a vacuum of about 6 tenths, which, of course, assists the pull.

There are, therefore, no consumers off this length of 18-in. main and a portion of the 12-in., nor must there be a leakage, or, I might more correctly say, an inlet of any description for air or water to be sucked in. As the main is mostly under pressure, a leakage is likely to be quickly discovered. The zero for the inlet recorder must be near the centre of the chart.

With the fan boosters described, there is no danger of damage to apparatus by excessive pressures. If there is comparatively little gas passing the governor at the commencement of the period of maximum demand, a fan cannot develop a greater differential pressure than that corresponding to its speed. To increase the pressure difference, the speed of the fan must be accelerated.

Though the chances of a breakdown with a fan booster are rather unlikely, there is always the possibility of a temporary stoppage. With the failure of the electric current to a fan plant, the man in charge can only revert to ordinary district pressures. With a fan driven by a gas engine, the supply is always at hand, and any defect could probably be remedied quickly. If an outlying district depends upon a boosting plant for its efficient supply, the installation of a duplicate plant is advisable. The building at Mere Green is large enough for an additional fan booster, and connections are so arranged that one can be installed, by which means the added pressure of 14 in. can be doubled.

If an existing main will not allow of the maximum volume required being drawn off at times of greatest demand, or if it is not convenient or desirable to isolate a main, a small holder can be erected at an outlying point, to be filled by means of a fan when the demand for gas is small, and so help the district at the period when the demand is great.

This method has not been adopted in Birmingham, but the adoption, I should imagine, would depend upon the district concerned. In a well-to-do residential district it would probably be rather difficult to convince the property owners that a gasholder is a desirable neighbour.

Discussion.

Mr. A. R. MYHILL (Birmingham) who presided, pointed out that the subject had a great bearing on the popularity of gas, for most of the complaints made by customers were due to bad pressure.

Mr. W. MACNAUGHTON (Wolverhampton) said that boosting could be justified on the ground of economy in that it saved capital expenditure. He would like to know what was the effect of boosting on cast-iron or steel mains. Was there choking of the service pipes? Again it appeared that, after five years, the leathers on the governors had to be closely watched.

Mr. FINNEMORE observed that he had had considerable experience of boosting equipment, and he was satisfied that governor diaphragms would not occasion trouble if they received reasonable attention.

Mr. DONKIN (Bryan-Donkin Company, Ltd.) referred to the yearly

system of governor examination in Birmingham, and said that the results well justified it. Personally, he had never come across any trouble with the diaphragms.

Mr. F. J. BENGOUGH (Birmingham) suggested that on the question of comparative cost, it might be well to inquire as to the wisdom of installing extra holders at the works, instead of using boosters.

Mr. F. A. C. PYKETT (Coventry) pointed to the advantages arising from the governor house being built above ground.

Mr. H. R. HEMS (Birmingham) put in a strong plea for the maintenance of constant pressure. In some of the recently-developed furnaces, lower pressures could, he said, be used satisfactorily.

Mr. HOLT, replying on the discussion, stated that he had not experienced corrosion trouble in high-pressure governors. There did arise, however, a certain amount of fine dust. In cast-iron pipes the ordinary lead run joint with yarn was employed; and little trouble had been experienced. In governors in pits there was the danger of flooding. With one exception, all such governors were built in Birmingham above the ground. Pressures to-day were much higher than formerly, and he had no doubt that manufacturers would make their apparatus to suit the altered conditions. The diaphragm leathers could be oiled from the top of the chamber; but the most satisfactory method was to take out the diaphragm, and then do the necessary oiling, working the oil well into the leather. There was slightly more corrosion with steel mains than with those of cast iron.

VOTE OF THANKS.

Mr. PYKETT, in moving a vote of thanks to the author, pointed out that the fault with many gas undertakings was that of not maintaining a constant pressure. He did not think more than 10 p.ct. of the undertakings could guarantee this. Variation in pressure was very bad, and often explained the inefficiency of appliances. At Coventry extensions costing £12,000 had been sanctioned, in order to ensure the necessary pressure at peak periods, and particularly during the time required for the preparation of the Sunday mid-day meal. Mr. Pykett said he liked wet pressure recorders, despite the fact that some difficulty arose owing to freezing.

Mr. F. CAUDWELL (Shrewsbury) seconded the resolution.

Parliamentary Intelligence.

[From Our Special Correspondents.]

House of Lords.

Special Orders.

The following Special Orders have been approved by the Special Orders Committee and are awaiting the affirmative resolution of the House: Exmouth, Coventry, Birkenhead, Chichester, and Bury.

House of Commons.

Special Orders.

Mr. C. WILLIAMS, M.P. for Torquay, on a motion for the approval of the Rawmarsh Urban District Council Special Order, inquired how far this undertaking was developing, and what capital sum it was expending.

Mr. T. WILLIAMS, M.P. for Don Valley, said that he lived close to the urban district in question, and could state that the development was strictly in accordance with the known requirements of the district. The fact that the Order was on the paper was proof that it had given entire satisfaction to every authority concerned.

He was proceeding to deprecate any obstruction to the progress of the Order when Mr. A. M. SAMUEL intervened to move the adjournment of the House on the ground that the Parliamentary Secretary to the Board of Trade, who was responsible for the Order, was not present.

The SPEAKER pointed out that the Parliamentary Secretary was in the House, and Mr. T. WILLIAMS went on to say that, if anyone attempted to prevent this Order going through, they would deprive men of work which was very necessary.

At this point the Parliamentary Secretary to the Board of Trade, Mr. W. R. SMITH, explained that the Order was being made to permit of a maximum price being chargeable in this area, owing to an alteration being made to one of the clauses in the Act. This Order was not opposed by anybody in the district, and there was complete unanimity behind it.

Sir BASIL PETO inquired if it had anything to do with the employment of labour.

Col. HENEAGE said that the Member for Don Valley stressed the point that, if they opposed this Order, or even asked questions about it, it would have some effect on increasing unemployment in his area. As they now understood it, the whole effect of the Order was to enable the gas undertaking to increase the price of gas to the consumer. He failed to understand how this was going to affect unemployment, except to increase it. Perhaps there was some plot behind it to connect it with the Coal Bill. If the Coal Bill would put up the price to the consumer, this was perhaps a measure which the Government was trying to rush through, when no one was looking, in order to get the same end.

The motion for the approval of the Order was then put, and agreed to.

Plans have been deposited in connection with the Rochester, Chatham, and Gillingham Gas Order, and the Uxbridge, Maidenhead, Wycombe, and District Gas Order.

Private Bills.

The petitions of the Bournemouth Gas and Water Company against the Bournemouth Corporation Bill, the Chester United Gas Company against the Chester Water Bill, and the Liverpool Gas Company against the Liverpool Corporation Bill have been withdrawn.

The South Staffordshire Mond Gas Bill has been reported with an amendment from the Unopposed Bills Committee, and has been put down for consideration on the report stage this week.

Coal Mines Bill.

The amendment in the name of Mr. D. G. Somerville, M.P., which provides that no price rates shall be fixed differentiating to the disadvantage of coal used for the production of gas and electric light or power or in relation to the supply of water in comparison with those for coal sold for any other purpose, has been transferred from clause 1 of the Bill to clause 3.

Legal Intelligence.

A Compensation Question.

In the King's Bench Divisional Court, composed of Lords Justices Scrutton and Slesser, on Feb. 25, Mr. Wm. John Witcher, an electrician, of Twickenham, appealed against an order of Mr. Justice Mackinnon striking out his claim against the Windsor Royal Gas Light Company for injuries received while engaged on work on behalf of that Company at their gas-works.

The claim had been struck out by the Judge on the ground that it was vexatious, harassing, and an abuse of the processes of the Court.

It was explained that as a result of an explosion of gas at the works, Witcher was seriously injured in the course of his employment there, and he contended it was due to the negligence of the Gas Company's employees. The Company denied this, and said Witcher himself had been negligent. Several payments were made to him while he was in hospital. He thought they came voluntarily from his employers, for whom he had been carrying on the work at the gas-works, but the Gas Company contended that they were made as payments under the Workmen's Compensation Act, and that he could not sue them for damages, in consequence, seeing that he had received compensation.

Lord Justice Scrutton said a man could not receive payments under the Workmen's Compensation Act and, also, sue for damages. However, the appeal would be allowed, but the defendants would be given permission to amend their pleadings to the effect that there had been a recovery by the plaintiff of compensation; that plea to be a preliminary issue to be dealt with before the action was heard.

Gas Acts (1920 and 1929) Orders.

SECTION 6.

Chorley Corporation.

The Corporation shall, from April 1, charge according to the number of B.Th.U. supplied, and shall on or before March 15 give notice of the calorific value of the gas they intend to supply.

The maximum prices in respect of gas supplied by the Corporation shall be 11·4d. per therm and 12·6d. per therm, and these prices respectively shall be substituted for the prices of 4s. 9d. and 5s. 3d. per 1000 c.ft. mentioned in sub-section (1) of section 4 (limit of price) of the Chorley Gas Order, 1930.

Spalding Urban District Council.

The Council shall, from April 1, charge according to the number of B.Th.U. supplied, and shall on or before March 15 give notice of the calorific value of the gas they intend to supply.

The maximum price in respect of gas supplied by the Council shall be 14·4d. per therm.

Solihull Gas Company.

Section 5 (additional capital) of the Solihull Gas Order, 1926, shall have effect as if, in addition to the powers conferred upon the undertakers by that section of raising additional capital not exceeding £20,000 by the creation and issue of new ordinary or preference shares or stock subject as therein provided, the undertakers were authorized to raise in like manner for the purposes of their undertaking during the period of three years after the date of this Order by the creation and issue of new ordinary shares further additional capital not exceeding in the whole £16,000, after taking into account any premiums or discounts obtained or allowed on the sale of such shares.

Tottenham and District Gas Company.

The Annual Ordinary General Meeting of the proprietors of the Tottenham and District Gas Company was held at the Company's Chief Office, No. 639, High Road, Tottenham, N. 17, on Tuesday, Feb. 25—Mr. Henry Woodall, M.Inst.C.E. (Chairman and Managing Director), presiding.

The Secretary (Mr. Edward J. K. Fussell, F.C.I.S.) read the notice convening the meeting, and the common seal of the Company was affixed to the register of shareholders. The Directors' report and statement of accounts for the year ended Dec. 31, 1929, were taken as read.

THE CHAIRMAN'S ADDRESS.

The Chairman said: The accounts I have the pleasure of presenting to you are in every way satisfactory. The first thing I think that will appeal to you is that we now have only one class of ordinary stock, instead of two as formerly, owing to the conversion under the Act of 1928.

Last year I deplored the fact that there had been a slight increase in the amount of capital per million c.ft. of gas sold. The figures in 1927 were £469, in 1928 £475, and in 1929, the year under discussion, it comes down to £462. This is all the more satisfactory when you turn to Table "C" and find that we have actually decreased our capital by £7276 (excluding capital added on amalgamation) in spite of the fact that we have increased our sales of gas by 140 million c.ft.

Revenue Account.

Turning to the revenue account, the first item on the debit side calling for attention is the £7659 charged to special purposes fund for the purpose of writing off a part of the works no longer used at Waltham. It will be noticed that rates are down by over £4000. Though the assessments were increased, the rates in the £ are lower. You will notice the three last items in the revenue expenditure. The result flowing from expenditure under this head has been very gratifying. The shareholders may be reminded that the first National Health Insurance Act was passed in 1912, and at that time the Company decided to shoulder the responsibility of setting up an Employees' Approved Society under the Act. The responsibility carried with it a guarantee by the Company with regard to the solvency of the fund and the making up of any deficit that might occur on quinquennial valuations of the Society. It is satisfactory to be able to report that owing to the good management by a Committee consisting of representatives of the Company and the employees of the Company, the Society, on each of the three valuations which have taken place since its inception, has been able to report to its members a considerable surplus.

The surplus acquired by this good management enables the Society to distribute, in addition to the standard rate of sickness benefit of 15s. per week, an additional 7s. 6d. per week, making the total sickness benefit a sum of £1 2s. 6d. per week, payment being made from the first day of sickness, and not from the third day as is usual. The standard rate of disablement benefit which is 7s. 6d. per week has also been increased by 3s. 0d. per week to a total payment of 11s. 3d. per week. In addition, the Society has now arranged to pay 75 p.ct. of the cost of dentures, the whole of the cost of dental treatment, 75 p.ct. of the cost of optical appliances, and the whole of the cost of optical treatment. A sum has also been set aside out of the surplus to assist members of the Society to take advantage of convalescent domiciliary treatment. Many attempts have been made among the employees to supplement the benefits under the National Health Insurance Act by forming what are known as "sick clubs;" but the attempts were not successful.

The employees then approached the Company and suggested that a Welfare Association might be formed under the management and guidance of the Company. The officers of the Company prepared a scheme, and this received the sanction of the Directors. The Welfare Association came into being on Jan. 1, 1929. It is open to co-partners only, and we are glad to report that a large majority of co-partners took advantage of the scheme, and there are nearly 1000 members at the present time. The contribution is at the rate of 7d. per week. One penny of this is ear-marked for contributions as to one moiety to the Prince of Wales's Hospital, and the other moiety to the Hospital Saturday Fund.

The benefits under the Welfare Association consist of the payment of £1 per week during the first six weeks of sickness, and 10s. per week for a further six weeks. In addition, the contributions to the Hospital and the Hospital Saturday Fund enable the Committee of Management to distribute dental, optical, and surgical appliance benefits and contribute towards the cost of maintenance in convalescent homes.

It is difficult to realize what an enormous boon these Societies are to our workpeople. They are very greatly appreciated, and the excellent results are a tribute to the great care which is exercised by the Committee, largely composed of the workpeople themselves, in dealing with every case.

The only other item I will call your attention to is the charge for pension fund, which is down by nearly £7000; but the larger figure in 1928 included a sum of £8371, which the late Waltham Company set aside for the purpose.

Income.

On the credit side you will notice we have an increased income from public lamps of £1154. This is very satisfactory. We have, in most severe competition with electricity, obtained a large amount of the lighting of the new arterial roads. Last year the increase in the number of public lamps was 262, and we now light in all 7538 lamps. There is no doubt that gas is the best illuminant for street lighting, both the police and the public giving evidence to this effect.

Coke sales are good; but, like everyone else, we suffered from a fall in tar prices. The increase of £22,000 in the coke sales is very satisfactory, and is due, partly to increase in price, but largely to the better carbonizing figures, on which our Engineer, Mr. H. C. Smith, and his staff are to be congratulated. Coal during the year cost less, and the residuals produced more, the result being that the net cost per ton of coal was 10s. 9·2d., or 1s. 1·2d. less than in 1928. It is largely because of this that we are able to produce so good a report.

The Waltham Amalgamation.

I would here like to refer for a moment to the results of the amalgamation with Waltham. The consumer in the old Tottenham area has in no way suffered, because we are obliged by the 1928 Act to charge a differential price of 4d. per therm in the added area. In the Waltham area the price has been reduced by 6d. per 1000 c.ft. During the first year of this Company's administration, we have obtained a number of new consumers, and what is perhaps more important, the old consumers are using more gas per head. There is plenty of room for expansion in the new area, and I am satisfied that the amalgamation will be to the increasing advantage of the whole of our consumers. In most amalgamations there is the unfortunate result that a number of men are thrown out of employment. In this case, I am very glad to say, as you will be to hear, that, owing largely to our increased sales, we have been able to find work for all the regular employees of the Waltham Company.

Electricity.

The profit on this side of our business is £16,692—a slight increase on last year, in spite of a reduction in the lighting charges. The price charged, 4½d. per unit, is now lower than in the surrounding districts.

In the profit and loss account you will see we have provided for the balance of the costs of the Gas Act, 1928, compensation under the Waltham amalgamation, and capital duty. These items might have been capitalized, but you will agree we have adopted a wise policy in getting rid of them. The net result is, that, after paying full statutory dividends, which over the whole year show an increase of 1s. 3d. p.ct., and adding £8000 to our reserves, the carry-forward is increased by £1856, and now amounts to £45,375. In order to earn the 1s. 3d. p.ct. extra, which amounts to £672, the consumers were given a reduction in price equivalent to £7281.

Referring to the general balance sheet, it will be seen that the free reserves, after the payment of the dividend to be declared, amount to £207,416, an increase of £3853 over last year. The total amount invested in respect of these funds is £54,441, as against £19,571 in 1928. You will no doubt welcome the investment, outside the business, of this further sum of nearly £35,000.

The last but one item—New Offices Suspense Account £3500—needs a little explanation. Last year I told you that our office accommodation was inadequate, as indeed it might well be, having regard to the growth of the Company's business. In 1900, when these offices were built, our consumers numbered just under 18,000; they now number 107,000. In addition there are 4000 consumers of electricity. The gross revenue of the Company in 1900 was £138,000. To-day the gross receipts amount to over £1,000,000 per annum.

After very carefully considering the extension of these offices, getting out complete plans, and obtaining tenders, we found the cost would be very heavy, and the accommodation, in the end, not altogether satisfactory. Just as we had to decide one way or the other, a property came into the market which in many ways admirably suited our purpose. The building is in Wood Green, and was erected for a boys' masonic school. Since our acquisition of the site, it has been decided to extend the North London Tube in that direction. The new buildings will need very considerable alteration, but it is anticipated that we shall be able to dispose of some of the land and buildings which are larger than we shall require. We anticipate in the end that the new premises, which, on account of their situation and distance back from the road, will be quiet and healthy, will prove to be cheaper, as well as much more satisfactory, than the alteration and extension of this building.

My colleagues have done me the honour to suggest that the new building shall be called "Woodall House," an honour I much appreciate.

The Coal Bill.

As you are aware, there is now before Parliament the Government Coal Bill. It is a Bill which I believe has few friends. If passed, it will inevitably increase the price of coal. Under the Bill the commercial and technical affairs of the coal trade become subject to bureaucratic and political influences—a state of things, I imagine, no one desires, least of all those directly connected with the coal trade. No great and powerful trade could ever acquiesce in this, or hope for, and deserve, success under such conditions. It is contrary to British ideas, and kills enterprise. The foreign manufacturer is still to obtain his coal at a reduced price on account of a levy to be raised on coal consumed at home.

A short time ago I was buying coal for use abroad, and for use on the East Coast of England. The coal was the same coal, from the same pit, bought from the same merchants, and the price was f.o.b. Goole, in the case of the coal for the foreign works, 5s. 4d. per ton, or about 30 p.ct. less than for the coal for the English

works. So the foreigner, who is in this case a serious competitor in our home market, greatly benefits. The coal merchants informed me that the 5s. 4d. was made up of 4s. levy and 1s. 4d. under the De-rating Act.

This seems neither fair nor equitable. We have the finest coal in Europe, and I believe that the export trade could have been recovered largely on quality. I do not wish to appear impertinent in offering advice, but if the coal-owners, instead of giving a bonus on exported coal, had spent a portion of that bonus on extra cleaning and grading of the coal, I think the same results would have been obtained. Why have the foreigners been able to increase their output in the way they have? Mainly, I believe, because of their improved methods of washing and cleaning. Had it not been for the coal stoppage in 1926, and the consequent necessity for the use of inferior foreign coal, it would never have been exploited as it has been. Mr. Archer tells us, in "The Times" of the 22nd inst., of the increase of millions of tons in the output of coal in German, France, Holland, Silesia, and elsewhere. I am led to believe that if only our coal were as carefully treated as the foreigner has to treat his coal to sell it at all, we could re-capture our foreign trade, instead of penalizing the home consumer.

We have urged the local Members of Parliament to vote against the Bill, and we would ask all present, and all our shareholders, to do all they can to defeat it

In conclusion, may I say that we have every reason to be satisfied with the healthy position of our Company and our industry, in spite of State-aided competition, coal difficulties, and other troubles. We are only in this position because we have husbanded our resources, improved our methods of manufacture, and effected economies wherever possible. It will not do for us to rest satisfied, and it is for this reason that we strenuously oppose every restriction on our liberty to carry on our business without undue interference.

We must, and do, however, recognize that it is only by sending out gas at the lowest price, and of the highest quality, compatible with economic production, that we can hope and expect to prosper.

The Chairman then moved:

> That the Report of the Directors and Statement of Accounts for the year to Dec. 31, 1929, be received and adopted, and that the Report be entered on the minutes of the proceedings of this day.

Mr. Arthur Edward Broadberry, M.Inst.C.E., M.Inst.Gas E., seconded the resolution; and there being no questions raised by shareholders, it was put to the meeting and carried unanimously.

Dividends.

Mr. Henry Bailey (Deputy-Chairman) moved:

> That dividends at the rates of 5½ p.ct. and 5 p.ct. per annum respectively on the preference stocks, and £6 12s. 6d. p.ct. per annum on the ordinary stock, all *less* income-tax, be declared for the half-year ended Dec. 31, 1929, payable on March 1 next.

They had had a good year, said Mr. Bailey, and there was no need for him to say anything further about the profits of the business. They had certainly earned their profits, and if things went on favourably with them, they hoped to continue to do so

Mr. George Hay Morgan, K.C., B.Sc., seconded the resolution for the declaration of dividends, which was carried unanimously.

Re-Election of Retiring Directors.

The Chairman then proposed the re-election of Mr. Henry Bailey, being one of the Directors retiring by rotation. The Chairman said Mr. Bailey was one of the oldest Directors on the Board. He had been a Director for 35 years, and had seen the Company through bad times and good times; while his knowledge of the Company's business proved extraordinarily useful to them all.

Mr. William Alfred Surridge, in seconding the resolution, said that as a member of the Finance Committee, he could add his testimony to the valuable aid Mr. Bailey gave in their work

The Chairman then proposed the re-election of the other retiring Director, Mr. Surridge, saying that he (Mr. Surridge) had been with them now for eight years—it hardly seemed so long—and they had found him extremely useful to them in many ways. He had an extensive knowledge of the coal trade, and was Chairman of other companies, and ever ready to put his knowledge at their disposal.

The motion was seconded by Mr. Thomas Goulden, M.Inst.C.E., M.Inst.Gas E., and carried unanimously.

Mr. Bailey, in returning thanks for his re-election, stated that he would be very pleased to remain upon the Board as long as he was able to do the work.

Mr. Surridge also returned thanks for this further mark of their confidence, which, he said, he would do his best to deserve. It was a great pleasure for him to continue as a Director of this Company, in which he had always taken a real interest.

Re-Election of Auditor.

Mr. J. Taylor proposed the re-election of the retiring Auditor, Mr. William Cash, Junr., F.C.A., saying that they were very lucky to have Mr. Cash to follow after the long innings his father had had.

Mr. G. Slapp seconded the resolution, which was carried with acclamation.

Mr. William Cash, Junr., in returning thanks for his re-election, thanked the shareholders for this renewal of their confidence. He referred to the changed name of the Company, reminding them that it used to be called the Tottenham District Light, Heat, and Power Company. This was at a time when people did not know that gas stood for light, heat, and power. The change of name indicated that the public now realized all that gas stood for.

Vote of Thanks to Chairman, Directors, and Staff.

Mr. S. Sandell said he would like to propose that the best thanks of the proprietors of the Company be given to the Chairman, Directors, Auditors, officers, staff, and workmen for their services during the past year. They could congratulate themselves, he said, on their Chairman and Directors. On almost every occasion they came there they had been told of some fresh extension. On the present occasion it was concerning the new offices. The clerical staff were a little in the background; but they observed their work in the excellent results of the Company. The harmonious working of those in the gas industry had become almost a byword—and more so than ever in the Tottenham Company. It was thus that they were able to show such excellent results.

Dr. L. P. Scott seconded the vote of thanks.

The Chairman, in replying, said that he and his colleagues did realize that such results as they were able to put before the shareholders could only be obtained by all the staff and Directors working together. They knew that they had had a co-partnership scheme for some considerable time and also an excellent pension fund. That pension fund was one of the earlier ones to be formed and had been in operation six years. Their workpeople were thus able to retire on a decent pension. The spirit of co-partnership permeated right through the Company from the top to the bottom. The Directors, said the Chairman in conclusion, had the greatest possible confidence in their chief officers.

Mr. Harold C. Smith, M.Inst.C.E., M.Inst.Gas E. (Chief Engineer), on behalf of the technical staff, said he would like to return thanks for the very kind things the Chairman had said about the part of the undertaking concerning himself. If they did not all work together in this way it would be impossible for them to produce results anything approaching those which they had seen that day. Any schemes suggested from time to time to the Directors were given sympathetic consideration, and they always backed the staff up. He was very interested in the Chairman's remarks about clean coal. It would make a wonderful difference to their working, and they would be able to produce better results than they did already.

Mr. Edward J. K. Fussell, F.C.I.S. (Secretary) also returned thanks on behalf of his staff, saying that all that had been said about them was thoroughly deserved. He was sure the staff generally appreciated very much the prospect of moving into larger premises. Thirty years was a long period in the life of an industry, and if they did not get on in thirty years there was something very rotten. When he reminded the shareholders of the figures mentioned by the Chairman that since 1900 the number of their consumers had increased from 18,000 to 107,000, besides an increase in consumers of electricity, they would understand that in that time the staff must also increase to cope with the larger business.

This closed the business of the Ordinary General Meeting.

EXTRAORDINARY GENERAL MEETING.

An Extraordinary General Meeting immediately followed, when the following resolutions were submitted:

(1) That the Directors be, and they are hereby, authorized from time to time, at such times and in such amounts as they think fit, to raise by the creation and issue of ordinary stock or of redeemable or irredeemable preference stock the whole or any part of the additional capital authorized by the Tottenham and District Gas Act, 1928, and to determine, within the limit by the said Act fixed, the rate of dividend payable upon any such preference stock and to determine as regards any such preference stock issued as redeemable stock the terms and conditions upon which the same shall be redeemable.

(2) That the Directors be, and they are hereby, authorized from time to time at such times and in such amounts and subject to such conditions and at such rate or rates of interest as they may from time to time determine, to raise by borrowing on mortgage of the undertaking or by the creation and issue of redeemable or irredeemable debenture stock, any sums which the Company may from time to time be authorized so to raise under the said Act in respect of the capital for the time being issued and paid up, and to reborrow on mortgage or by the creation of such debenture stock any moneys so raised and paid off.

(3) That with regard to any preference stock issued as redeemable preference stock and to any debenture stock issued as redeemable debenture stock, (*a*) such stock or any part thereof may be called in and paid off at any time before the date fixed for redemption, and (*b*) such stock or any part thereof may be redeemable either by paying off the stock or by issuing to any stockholder subject to his consent other stock in substitution therefor. And such calling in payment off or redemption (if any) may be carried out by the Directors when they think fit.

(4) For the purpose of providing money for paying off redeemable, preference, or debenture stock or of providing substituted stock, the Directors may issue or create and issue (subject as regards preference stock to the provisions of the sections in the Company's Acts of Parliament relating to the sale of stock by auction or tender) new stock (either redeemable or irredeemable) or re-issue stock originally created and issued as aforesaid so, however, that the creation and re-issue for that purpose of any particular class of stock does not make the total nominal amount of such stock exceed the amount of that class of stock which the Company are for the time being authorized to create, except (*a*) during the necessary interval between the creation and issue of the new stock and the redemption of the old stock, and (*b*) when the new stock is issued in substitution for stock which was itself lawfully issued.

Mr. Taylor, in seconding the resolutions, said that they would see a more favourable money situation in the city than they had last year. It was, therefore, a very suitable opportunity for placing stock on the market at reasonable terms.

The resolutions were unanimously agreed to, and the proceedings then terminated.

Barnet District Gas and Water Company.

The Annual Ordinary General Meeting of the Company was held on Monday, Feb. 24, at the Cannon Street Hotel, E.C.—Mr. William Cash, F.C.A., J.P. (the Chairman), presiding.

The Secretary (Mr. E. D. Davey, F.C.A.) read the notice convening the meeting; and the report of the Directors and the statement of accounts for the year ended Dec. 31, 1929, were taken as read.

The Chairman, in moving their adoption, said it was a great pleasure to him to do so; and he hoped the proprietors would agree with the Board that the accounts presented a satisfactory result of the year's operations. They had sold in the period under review £50,000 of debentures at a price to yield £5 6s. 5d. p.ct. to the purchaser, which afforded evidence that the Company's securities were still favourably regarded by the investor. On the expenditure side of the capital account, they had put up some additions to the retort house, installed waste-heat boilers, and enlarged some of the buildings. On water account, they had built some cottages, and had begun the construction of the reservoir authorized by the last Act at Arkley, which would have a capacity of 5 million gallons, and would cost some £27,000 by the time it was completed. The business continued to grow, and therefore considerable sums had been expended on new mains, of which there had been laid about 5¼ miles for gas and 7¾ miles for water. In the year that had now been entered upon it would be necessary to complete the Arkley reservoir; and arrangements had been made for the laying of a new 20-in. trunk main from this reservoir to High Barnet. Opportunity had been taken to acquire 6 acres of additional land in close proximity to the existing reservoir. This was a wise thing to do, as the land was the highest in the district, and the most suitable for their purpose.

The Revenue Account.

The results shown in the revenue account were satisfactory. Gas sales were up by £2681, and a reduction in price during the year accounted for another £2671. They had sold 25¾ million c.ft. more gas, which was an increase of 7½ p.ct., and 699 new consumers had been added. The price of gas was now lower than the maximum authorized prior to the war. On the water side, the receipts were £5536 up, which was a little more than 5½ p.ct.; and the quantity of water supplied had been just over 5 p.ct. more than in the preceding year. The average daily supply per head showed a small decrease. New water consumers numbered 1173. It had to be borne in mind that the Company's water area and gas area were not co-terminous. Receipts for building water supplies indicated that new houses were continuing to be put up. The summer was a very dry one, and an appeal had been issued to consumers to conserve the water. It had not been necessary to curtail the supply, because the consumers were good enough to modify their demands to a certain extent. With the exception of about 1 p.ct., the whole of the water during the year had been supplied from the Company's own sources. From Michaelmas last they put into force their revised water charges, based on the new valuations; but they had been able to reduce the percentage charge, which was now within the pre-war scale. In fact, in some instances it was even less than the amount authorized. No further reduction in water charges was contemplated at present.

Definition of "Domestic Supply."

Included in charges for domestic supply were quite substantial sums for what were known as "extras"—*i.e.*, charges for baths, extra baths, and additional closets. These sums totalled £6500. Now the Ministry of Health had appointed an Advisory Committee on Water; and their Legislation Sub-Committee had issued a second report, and in a summary he found it stated: "Domestic supply should be defined so as to include closets and baths of ordinary size, and special charges should not be made for them. When the early Water Acts were passed, these conveniences were exceptional; now they are common, and special charges for them no longer accord with modern conditions." Undertakers who levied these charges would be penalized by the loss of this source of revenue; and it was suggested that the Ministry of Health should be empowered, on the application of the undertakers, to issue an Order providing for any alteration which appeared necessary in the charges which the undertakers were authorized to levy. In the case of their own Company, when the gross value of a house did not amount to £40, they were entitled to make a charge where a bath was fixed. At present they had nearly 12,500 houses of this class, and of these 5460, or 44 p.ct., had no fixed bath. If the suggestion put forward in the report to which he had referred were adopted, it would mean that these latter houses would have to pay an increased percentage rate for a service which at present could not be rendered. He had seen statistics referring to big municipalities where they had from 25 to 30 p.ct. of the consumers without baths. It was obvious that if the Company were compelled to do away with these extra charges, they would have to be given additional revenue in some other form. It would seem on these figures very unfair that the people who at present had no bath should be asked to make up the deficiency.

The Coal Situation.

As a gas and water company they were in both departments interested in the question of coal. Discussion was now going on in the House of Commons with regard to certain proposals affecting the coal industry. All they could hope was that if something was done to assist the coal industry, it would not be done at the expense of other industries. If there was to be differentiation as between public utility undertakings and other users, and if the former were to be asked to pay an additional price for their coal, the charge to the consumers for the commodities which they supplied was bound to go up. They had, therefore, some anxiety as to any suggested interference of this character. Speaking generally, their position as a Company was not unsatisfactory, in the sense that they had contracts, made in good faith between willing buyer and willing seller, which would carry them on for some little while yet.

The Balance-Sheet.

Turning to the balance-sheet, it would be observed that the pension fund, instituted a year ago, continued to grow. They put £1250 into it twelve months ago, and this year that special contribution had been repeated. Now for the first time the men's contribution was brought into account. The fund now stood at £5457, of which nearly £4000 was invested. All the employees were very gratified to know that this fund had been instituted, and he was sure the proprietors would agree that it was a right and proper way of taking care of those who had served the Company loyally and well. They proposed to transfer £2000 to the reserve fund; and they were carrying forward to the balance of profit and loss account some £749 more than was brought in. They had fully earned their dividends, and had made the statutory contributions to the usual funds, and he thought this justified his opinion that the Directors were presenting a satisfactory set of accounts.

The Deputy-Chairman (Mr. William Richards) seconded the motion for the adoption of the report and accounts, and it was at once carried unanimously.

On the proposition of the Chairman, seconded by Mr. Docwra, a dividend was declared for the half-year ended Dec. 31, 1929, on the ordinary stock, at the rate of 7 p.ct. per annum, *less* income-tax, making, with the interim distribution, the full statutory dividend of 7 p.ct. for the year.

The retiring Directors (Mr. William Cash and Mr. Alfred Wood) and the retiring Auditor (Mr. B. D. Holroyd, F.C.A.) were re-appointed.

The Chairman, proposing a hearty vote of thanks to the staff and employees generally, remarked that the Company was very fortunately situated. Mr. Haseldine, their Engineer, had proved his value, and had done excellent work for them in every direction; while the Secretary possessed special qualifications which he was able to place at their disposal. Of the service rendered by all who were employed by the Company, he had nothing to say but good.

Mr. Taylor seconded the vote, which was cordially passed, and acknowledged by Mr. Haseldine and Mr. Davey.

The proceedings were brought to a close with a vote of thanks to the Chairman and Directors, which was accorded on the proposition of Mr. Pierce, seconded by Mr. Crookenden.

Gas Companies' Results in 1929.

A General Increase of Business.

ALTRINCHAM.

The Annual Meeting of the shareholders of the Altrincham Gas Company was held at the Company's Offices, Cross Street, on Feb. 11. In the absence, through indisposition, of Mr. W. W. Baker, Chairman of the Company, the meeting was presided over by the Deputy-Chairman, Mr. Charles H. Syers. Dealing with the balance-sheet, Mr. Syers pointed out that the statements of share and loan capitals showed increases of £4250 and £875, those being the amounts of new capital raised during the year. From the capital account it would be noted that they had expended a sum of £10,405 on new buildings, new mains, and new meters. The expenditure on new mains had been rather more than normal by reason of the fact that the Partington area had been developed. No doubt this area would grow more and more profitable as time went on. They had again written off £1000 for depreciation of meters and stoves, leaving the total of their capital account at the figure of £210,043. The revenue account showed a very satisfactory result, and he wished specially to emphasize the fact that their sales of gas amounted to 421,842,900 c.ft., against 379,430,600 c.ft. for 1928, or an increase of no less than 11·17 p.ct. The total cash receipts under that heading amounted to £61,517, being an increase of £4763 over the figure of £56,754 for 1928. Residuals showed a further decrease, for, while coke was £1027 up at £12,810, tar was down £3087 at £2703. On the debit side, coals at £29,994 had cost them £473 more, but they had carbonized more coal. Wages at £4897 were £189 up, repairs and maintenance of works at £6884 showed an increase of £1258, accounted for by the fact that more work had fallen due for renewal,

and that an opportunity had been seized to carry out several improvements, notably the removal of their fitters' shop, which, when quite completed, would be one of the best fitters' shops possible for a Company of their size. After providing for interest on mortgage bonds, the amount of the interim dividend, and income-tax, the disposable balance was £6980, which would provide for the full statutory dividends on the share capital and leave a balance of £3244 to be carried forward. The reserve fund now stood at £13,729, and under the provisions of the Gas Regulation Act, 1929, they were able to increase this fund to approximately £20,000.

ANDOVER.

The Annual Meeting of the Andover Lighting and Power Company was held at the Offices, Bridge Street, on Feb. 27—Mr. W. Percival Clarke (Chairman) presiding. The Chairman, proposing the adoption of the report, said that the sale of gas had increased by £500, which was quite good, and residuals were £100 better in spite of the loss on sulphate of ammonia. The £26 appearing under that head cleared up the account from the previous year. The economies effected by the new plant would show an increase in the receipts from coke in the present year. They had a balance to carry to profit and loss of £2655, and that account showed how it was disposed of in interest on debentures and dividends due to shareholders. He found that nine years ago their output was 40 million c.ft. per annum; now it was 61 millions, which was a good increase, and for a small Company fairly satisfactory. The capital employed for each million c.ft. manufactured had gone down from £779 to £570, and the whole of the plant of the works had been kept up to date. Their ordinary dividend had gone up from 4 to 6 p.ct., which would be some satisfaction to the shareholders. Their new carbonizing plant was now in full use; everyone who had seen it, experts and others, agreed that for a small works it was as efficient a plant as could be found; they had two gas engines to supply the power, and both had given most excellent results; the remodelled building contained two beds of six retorts each, and those two beds were capable of producing rather more gas per day than four beds in the old house. They had made a contract for five years for the public lighting of the town, and they were glad that the town had seen that it was an advantage to have a long contract, for it enabled the Company to erect new lamps without charge, which they could not do unless they had some security of tenure.

BISHOP'S STORTFORD.

The sale of gas by the Bishop's Stortford, Harlow, and Epping Gas and Electricity Company for the year, 934,211 therms, is 22,240 therms (4,448,000 c.ft.), or 2·43 p.ct. more than that for the preceding year. The balances carried from the revenue accounts (gas and electricity) to the credit of the profit and loss account amount to £12,586. Adding thereto £6 3s. 3d. received for interest, and £5380 brought forward from the preceding year and deducting therefrom interest, income-tax and other charges, and transferring £134 to the reserve fund, leaves £13,485 available for distribution. Interim dividends for the half-year ended June 30, 1929, were paid at the following rates—viz., on the "A" ordinary stock, £3 11s. p.ct.; on the "B" ordinary stock, £3 5s. p.ct.; on the "C" 5 p.ct. preference stock, £2 10s. p.ct.; and on the "D" 4 p.ct. preference stock, £2 p.ct. (all *less* income-tax); and the Directors now recommend the declaration of dividends for the half-year ended Dec. 31, 1929 (being final dividends for the year), at the same rates (all *less* income-tax), making a total distribution for the year of £7 2s., £6 10s., £5, and £4 p.ct. respectively on the several classes of stock. These appropriations amount to £8006, and leave a balance of £5478 to the credit of the profit and loss account to be carried forward. Owing to the continued development of the Company's gas undertaking, extensive and important additions to the manufacturing and distributing plant have been carried out entailing very considerable capital expenditure.

BRENTWOOD.

The Directors of the Brentwood Gas Company submit the following statement of accounts for the year ended Dec. 31, 1929. The balance carried to profit and loss account is £9033, and this amount added to the balance brought forward from last year, £3285, makes a total of £12,319. After providing for income-tax, loan interest, and other charges, there remains a balance of £8782 available for distribution. From this amount interest and dividends have been paid as follows: On the perpetual debenture stock at the rate of £5 10s. p.ct. per annum; on the preference stock at the rate of £5 p.ct. for the year; on the redeemable preference stock at the rate of £6 p.ct. for the year; and interim dividends at the rate of £8 p.ct. per annum on the original stock and £5 12s. p.ct. per annum on the additional stock (all *less* tax). The Directors recommend payment of final dividends (*less* tax), which with the interim dividends already paid, will make £8 p.ct. on the original stock and £5 12s. p.ct. on the additional stock for the year. These dividends, together with the interim and preference dividends, will amount to £5489, leaving a balance of £3293 to be carried forward.

BRIGHTON.

The sale of gas by the Brighton and Hove General Gas Company, compared with that for the preceding year, shows an increase of 508,322 therms, or 4·47 p.ct. The price of gas was reduced from 9·6d. per therm to 9·2d. per therm as from Lady Day, 1929, a further reduction to 9d. per therm being made as from Michaelmas last. The profits for the year, including interest received, amount to £92,158, to which must be added the sum of £77,417 brought forward from the previous year, making a total of £169,676; after deducting therefrom the sum of £25,520 for interest, income-tax, &c., a balance of £144,155 remains available for disposal. Interim dividends declared by the Directors for the half-year ended June 30, 1929, were paid in August, 1929, as follows: £3 p.ct. on the "B" preference consolidated stock; £2 p.ct. on the "C" preference consolidated stock; £3 p.ct. on the "D" redeemable preference stock; £3 15s. p.ct. on the 6 p.ct. standard consolidated stock; and £3 7s. 6d. p.ct. on the 5 p.ct. standard consolidated stock (all *less* income-tax); and the Directors now recommend the declaration of dividends for the half-year ended Dec. 31, 1929, being the final dividends for the year, at the same rates, and that £3735 be transferred to reserve fund. These appropriations, including the interim dividends, amount to £65,080, leaving a balance of profit of £79,075 to be carried forward.

BURNHAM.

Presiding at the Annual General Meeting of the Burnham-on-Sea Gas Company on Feb. 22, the Chairman, Mr. John Cox, said that the Directors' report and statement of accounts for the year ended Dec. 31, 1929, were the best in the long history of the Company. Gas sales had increased by 8·3 p.ct. Leakage had decreased by 1⅓ p.ct. A system of free maintenance of all gasfittings and appliances in consumers' premises had proved very successful. It would probably be extended in the near future, unless the Government's Coal Bill resulted in an increase in the price of gas coal. The carbonizing results were exceptionally good, and the very substantial economies thereby effected had much more than counterbalanced a big drop in the revenue from residual products. Using a Moore gas generator plant, *plus* horizontal retorts, the output of gas per ton of coal averaged 20,325 c.ft. The calorific quality of the gas had averaged 454 B.Th.U., and, based upon the declared standard of 450 B.Th.U., the therms made per ton of coal had averaged 91·5 throughout the year, without the use of any liquid enrichments. A recommendation of the Directors was adopted that payment of dividends on the three classes of shares be declared at £10 12s. 6d., £7 8s. 9d., and £6 7s. 6d. p.ct. per annum respectively. The sum of £500 was voted to the reserve fund; £122 to the special purposes fund; and £1273 carried forward to next year's account.

CHELTENHAM.

The Directors of the Cheltenham Gas Light and Coke Company submit the following statement of accounts for the year ended Dec. 31, 1929, showing a profit of £20,602. In pursuance of their policy of building up the contingencies fund, the Directors propose to set aside the sum of £2500 for this purpose, bringing the fund up to £25,000. The quantity of gas sold to consumers in 1929 was larger than in any former year of the Company's history—viz., 578,437,500 c.ft., being an increase of 33,389,700 c.ft. over the quantity sold during the previous year. The cold spell in the early part of the year accounted for over 22 million c.ft. of this increase. Extensive repairs in the horizontal retort house have been completed during the year, and the retorts generally are yielding very satisfactory results; also the Company has effected replacements in respect of 13 of its old railway wagons, and has added 4 new wagons to stock out of capital monies. Considerable improvement in the services in outlying areas has been effected by the enlargement and extension of mains. In December last the Board entered into provisional agreements with the Tewkesbury and Winchcombe Gas Companies for the amalgamation of their respective undertakings on terms which were announced at an Extraordinary General Meeting of proprietors held on Dec. 19 last, and the Directors report that at that meeting the action of the Board was unanimously approved and confirmed. The necessary steps to obtain an Order from the Board of Trade for powers to raise capital and to enable the amalgamations to be carried through are in progress, and it is hoped that both transactions may be completed before the end of the year. The Directors recommend the payment of a dividend at the rate of 5 p.ct. per annum on the paid up consolidated ordinary stock for the year ended Dec. 31, 1929, out of the profits for that year.

CHESTER.

The 118th Ordinary General Meeting of the Chester United Gas Company was held at the Offices, Chester House, Northgate Street, Chester, on Feb. 13—the Chairman of the Board of Directors (Alderman Sir John M. Frost, J.P.) presiding. The following report of the Directors was taken as read: The balance of net revenue account, after payment of interest and dividend on debenture and preference stocks, and the interim dividend on ordinary stock, is £14,234, from which the Directors recommend the payment of a dividend on the ordinary stock of 3¼ p.ct., making 5¾ p.ct. for the year. The amount to be allocated for this dividend will be £5346, leaving a balance to carry forward of £8887. The increase in the quantity of gas sold has been so substantial as slightly to increase the receipts from gas, though the price during the first quarter of the year was 1d. per therm below the corresponding period of 1928. The returns from residuals have deceased, but otherwise the results of the year's working are quite satisfactory. The Chairman, in moving the adoption of the report and accounts, said: On the receipts side of revenue account the chief item, sales of gas, is very satisfactory. The sales for the year increased by 17¾ million c.ft., over 4 p.ct. more than in 1928. The total revenue expenditure is reduced by £5261, and the receipts are less by £2768. The balance carried to net revenue account is, therefore, nearly £2500 more than the previous year. From net revenue account we carry £237 to the reserve fund, explained by the fact that we could apply £1415 for the extra ¾ p.ct. dividend on ordinary stocks—the same amount as credited to the copartnership fund—and as the extra dividend absorbed £1178, the balance goes to reserve. It has been necessary to make extra provision for income-tax to an amount of £1000, and there is left a balance of £14,234, a slight increase on the balance at the commencement of the year.

CLEVELAND.

The Directors of the Cleveland Gas Company present the following report for the half-year ended Dec. 31, 1929. The profit made during

the half-year has amounted to £1033, to which must be added the amount brought forward from last half-year, £3269, making the balance at the credit of the profit and loss account at Dec. 31, 1929, £4303, which sum the Directors propose should be disposed of as follows: In paying a dividend at the rate of 3 p.ct. per annum (*less* income-tax) for the half year; in placing to the contingent fund (making it £9100) £200, leaving to be carried forward to next half-year's account the sum of £3505. During the half-year the Company has obtained a Special Order—viz., the Cleveland Gas Order, 1929, by which they are empowered to: (1) Take over part of the Brotton Gas Light and Coke Company's area at Carlin How; (2) charge for gas on a thermal basis; and (3) buy gas in bulk. Work under the Order has already been started. On Jan. 1, 1930, the Company adopted the thermal system of charging for gas, the declared calorific value being 460 B.Th.U. (gross) per c.ft., and the price 1s. 3d. per therm—a reduction equivalent to 7d. per 1000 c.ft. It is hoped that this reduction will encourage greater use of gas in the Company's area.

CORK.

The one-hundred-and-twenty-second Ordinary General Meeting of the Cork Gas Consumers' Company was held on Feb. 27—Mr. Wm. B. Harrington (Chairman) presiding. The notice convening the meeting was read by the Secretary (Mr. Richard Healy), who also read the statement of accounts, which showed, in comparison with last year's, a very satisfactory increase in the receipts from sales of gas. The balance of profit and loss was £7456, with which was recommended payment of the ordinary dividend at the rate of 8 p.ct. per annum, and a supplementary payment of 2s. per share on account of arrears of previous dividends which were paid at reduced rates. The Chairman, in moving the adoption of the report, said the sale of gas exceeded that of the corresponding period last year by over 14¼ million c.ft., representing an increase of over 8 p.ct. This rate of increase has, so far, been more than maintained in their deliveries of gas in the current half-year. There was also a satisfactory increase in the sale of coke, which was now so widely used for domestic and industrial purposes; but the returns from tar and sulphate of ammonia were not as good as last year. The sales of gas stoves and appliances exceed all previous records, the number fixed being £806, compared with 488 in the corresponding period, and there was a net increase of 367 in the number of meters fixed. The cookery examinations were held as usual this year, and the increases in the number of competitors and prize-winners were evidence of the interest taken by teachers and pupils in this important branch of domestic economy.

DERBY.

The 110th Annual Ordinary General Meeting of the Derby Gas Light and Coke Company was held at the Friar Gate Offices on Feb. 28—Mr. William Woolley (Chairman) presiding. In moving the adoption of the report and statement of accounts, the Chairman said: The number of our customers has increased, and we have on our books now for all purposes no less than 46,124 consumers. In the sale of gas alone we have had a record output amounting to 1891 million c.ft. If you compare that with the year 1922, when it was 1343 millions, you will see that it has increased in the seven years by over 40 p.ct. Of course, this large increase has not been brought about without some expenditure, and we have spent on capital account in new mains, meters, and gas appliances nearly £35,000; but we have written off for depreciation £11,250, which is £2000 more than last year, leaving a balance on capital account of £76,420. We contemplate considerable extensions at our Belper and Litchurch Works, and also propose to replace a large number of small mains by larger ones laid at a greater depth in order to withstand the heavy motor traffic. The amount received by the sale of gas is £250,229, being an increase of £4011 on the previous year, and this would have been more by over £5000, but we reduced the price of gas as from the March quarter of 1928 by 2½d. per 1000 c.ft., and this reduction has made a difference of £5412 to the revenue for the corresponding period of 1929. The total revenue is £358,998, leaving a gross profit of £65,228, and, in addition, we drew from our carry-over in 1928 £10,165 for special renewals of plant which is charged against revenue in previous years' accounts, but this year we do not propose to draw upon our reserves at all, and I feel sure you will regard the result as very satisfactory. Rates amount to the large sum of £13,179, being £3173 more; this increase, of course, is due to higher rates and increased assessments both in the borough and the outside parishes. The burden of local rates is a serious matter for both householders and industries, hence the need for the utmost economy by all public authorities. Coals have cost us this year £126,696, which is £2242 more than the previous year; but while we have managed to cover a considerable proportion of the cost of coals by the sale of residuals, the net cost of coals nevertheless has been increased owing to the reduced prices obtained for coke, tar, and other residual products.

GLOUCESTER.

Mr. J. H. Jones, Chairman of the Gloucester Gas Light Company, in moving the adoption of the report and accounts at the Annual General Meeting of the Company, on Feb. 26, stated that for years past the Directors had been able to put a satisfactory report before the proprietors, and they were again able to do so. Coming to details of the accounts, they showed receipts from gas sold of £99,412; meter and other rents of £13,075; residual products £18,759; and fittings and other items of receipt of £991; making total credits of £132,238. The ordinary cost of gas was reduced to 8'387d. per therm (or 3s. 3d. per 1000 c.ft.) from the past September quarter, and that price compared favourably with the majority of the gas undertakings of the country. The total sale of gas during the year had been 574 million c.ft., an increase of 9,500,000 c.ft. above the previous year. The net expenditure on capital account was £5149, which included a new main from Hucclecote to the Cross Hands, and for some distance on the Shurdington Road. For some years the Directors had recognized that their storage capacity was seriously deficient, continued Mr. Jones, and two of the gasholders were getting on to an age at which they might be expected to require considerable repair. The works were about eight miles from some of the extremities of the area supplied, and the Engineer had been considering the best position for a new holder, so that pressure could easily be applied at the furthest points of supply. Last year the profit-sharing scheme had been in operation for 21 years, and all were reminded of the benefits which had accrued to the employees and also to the Company from the institution. Owing to the diminution in the prise of gas, the amount paid to the fund was £1804, as compared with £1569 at the end of 1928.

HASTINGS.

The accounts of the Hastings and St. Leonards Gas Company for the past year show an expenditure of £124,836, with an increase of £153,314, leaving a balance of £28,478, to which has to be added £915 for interest, making a total of £29,393. The amount required for the dividends now recommended, interest on debenture stock, consumers' deposits, income-tax, and the interim dividends paid last September is £28,164. The price of gas was reduced as from the September readings of the meters to 10d. per therm, but it was then pointed out that if certain proposals materialized the price of coal would be increased, and this has now become the fact since forward contracts can only be made at higher figures. The markets for residuals, especially tar and liquor, remain in an unsatisfactory condition. Under the Rating and Valuation Act of 1925, the Company's property was re-assessed, and the total valuation of £5405 was increased to £9500, a very considerable addition to the revenue expenses. There was an increase in the number of consumers and in the demand for all kinds of appliances, and, chiefly as the result of unusually cold weather, which affected the heating load, the sale of gas increased 5·06 p.ct. Interim dividends (*less* income-tax) were paid in September as follows: £7 p.ct. per annum on the 5 p.ct. converted stock; £5 10s. p.ct. per annum on the 3½ p.ct. converted stock; and £6 8s. p.ct. per annum on the 5 p.ct. additional stock, and the Directors now recommend that the final dividends for the year be paid at the same rates.

READING.

The Annual General Meeting of the Reading Gas Company was held on Feb. 25 at the Offices, Friar Street, Reading—Mr. Stanley Hayward, J.P. (Chairman), presiding. The Secretary and Accountant (Mr. A. B. Stedman) having read the notice convening the meeting, the report and accounts were presented. The accounts accompanying the report show that the income for the year was £255,717 and the expenditure £218,349, leaving a balance of £37,367 to go to profit and loss account. The sum available for distribution was £38,956, and the Directors recommended the payment of dividends at the statutory rates for the half-year ended Dec. 31 last, interim dividends at this rate having been paid in September for the first half of the year. Mr. Stanley Hayward, J.P., in moving the adoption of the report and accounts, said: The net result of the year's working is a gross profit of £37,367. The dividend and debenture interest charges for the year amount to £28,323. The price of gas was reduced from Michaelmas last. On last year's sales 1d. per 1000 c.ft. reduction represents an annual saving to consumers of £5383. We have expended a large amount of capital during the year; this was chiefly in connection with the new gasholder and its foundations and on additional purifiers. An issue of £25,000 redeemable preference stock and £25,000 ordinary stock was advertised in June last; the redeemable preference stock was over-subscribed. I am of opinion that the issue—which is the largest we have made at one time—was most satisfactory. The foundations of the new gasholder were completed by the end of August, and work commenced on the erection of the holder. The stormy weather has caused some delay, but even so we hope the holder will be ready for use this year.

ROCHESTER.

The Annual Meeting of the Rochester, Chatham, and Gillingham Gas Company was held on Feb. 21—Alderman E. W. Willis, J.P. (the Chairman), presiding. In moving the adoption of the report and accounts, the Chairman said: Upon reference to the revenue account, it will be seen that rates and taxes have increased by no less than £7430. This is due to re-assessment, and has prevented a reduction in the price of gas being made. A new item of expenditure appears under the heading "Officers' Superannuation Fund." This amounted, in the year, to £1364. The revenue from the sale of gas shows an increase of £4670, and this is largely accounted for by the extra gas consumed early in 1929 during the extremely cold weather. Residuals brought in £5061 more than in the previous year, and this is largely due to more coke having been sold. I cannot let this opportunity pass, continued the Chairman, without making reference to the importance of this undertaking to the whole of the area within which it is permitted to operate. We give direct employment to 448 persons. Our wages bill during last year amounted to £65,696. We are the largest ratepayers; last year we paid £11,631 in local taxation. We received last year 55,055 tons of coal, all of which had to be unloaded from steamers, thus giving much work to riverside workers employed by other firms. All our gas is produced and distributed locally by local men. The Board are all local gentlemen, and almost all the capital invested in the Company is held by local residents. It can, therefore, surely be claimed we are essential in every sense of the word, and our desire is to provide such service as will not only satisfy the consumer, but provide work for even more persons than those already employed. At the end of this year, or to be precise, on Jan. 1, 1931, the Company must redeem (in accordance with the terms of issue) debenture stock amounting to £72,300, and the Directors are making an application to the Board of Trade for powers in connection with the re-issue or substitution of that stock. They have taken this opportunity of including in the application permission to extend the area of supply and to bring up to date other matters in connection with the undertaking.

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Feb. 28.	Rise or Fall on Week.	Transactions Lowest and Highest Prices During the Week.
£			% p.a.	% p.a				
171,978	Stk.	Feb. 6	5	5	Aldershot 5 p.c. max. C.	73–78	..	..
522,992	,,	,,	4	4	Do. 4 p.c. Pref.	70–73	..	..
1,551,868	,,	Sept. 26	7½	7½	Alliance & Dublin Ord.	93–96	..	..
374,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb.	60–63	..	..
522,655	,,	Aug. 29	7	7	Barnet Ord. 7 p.c.	112–115	..	..
300,000	1	Oct. 24	1/4⅛	1/4⅛	Bombay, Ltd	16/– 18/–	..	..
174,500	10	Aug. 29	8½	9	Bournemouth 5 p.c.	13–13½	..	..
500,050	10	,,	7	7	Do. B 7 p.c.	12½–12½	..	..
439,160	10	,,	6	6	Do. Pref. 6 p.c.	10¾–11¼	..	..
50,000	Stk.	Dec. 19	3	3	Do. 3 p.c. Deb.	53–56	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	72–75	..	..
357,900	,,	Aug. 29	7½	7½	Brighton & Hove 6 p.c. Con.	113–116	..	..
871,880	,,	,,	6½	6½	Do. 5 p.c. Con.	100–103	..	..
1,287 500	,,	Feb. 20	5	5	Bristol 5 p.c. max.	86–87*a*	..	..
855,000	,,	Sept. 12	7¼	7	British Ord.	112–117	..	113
100,000	,,	Dec. 19	7	7	Do. 7 p.c. Pref.	109–114	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	69–71	..	..
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	92–95	..	..
100 000	,,	Jan. 9	5	5	Cambridge 5 p.c. Deb.	88–91	..	..
100 000	10	Dec. 5	8	6	Cape Town, Ltd	8½–9½	..	9–9½
100.000	10	Nov. 7	4½	4½	Do. 4½ p.c. Pref.	6½–7½	..	..
150,000	Stk.	Dec. 19	4½	4½	Do. 4½ p.c. Deb.	69–74	..	..
626,860	,,	Feb. 20	6	6	Cardiff Con. Ord.	96–98*	..	..
237,860	,,	Jan. 9	7½	7½	Do. 7½ p.c. Red. Deb.	98–101	..	..
157,150	,,	Feb. 20	5	6½	Chester 5 p.c. Ord.	87½–92½*b*	..	..
98 986	1	Oct. 10	†2/-	†2/-	Colombo, Ltd. Ord.	34/—36/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	19/—21/-	..	..
375,402	1	Oct. 10	1/9⅜	1/9⅜	Colonial Gas Assn. Ld. Ord.	20/6–22/6	..	..
187,848	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	..
2,073,280	Stk.	Feb. 20	5	7	Commercial Ord.	87–92*	..	..
475,000	,,	Dec. 19	3	3	Do. 3 p.c. Deb.	54–57	..	..
787,560	,,	Feb. 20	7	7	Croydon sliding scale.	102–105*	..	102¾–103¼
453,100	,,	,,	5	5	Do. max. div.	78–83*	..	82–83
542 270	,,	Aug. 29	10	7	Derby Con.	120–125*e*	..	..
55,000	,,	Dec. 19	4	4	Do. Deb.	67–70*e*	..	..
209 000	,,	Aug. 29	5	5	East Hull Ord. 5 p.c.	73–75	..	..
1,002,180	10	Sept. 12	†7	†4	European, Ltd.	12½–13½	–¼	12¾–13¼
18,629,125	Stk.	Feb. 20	5⅔	5⅔	Gas Light & Coke 4 p.c. Ord.	17/4½–17/10½*f*	–/1½	17/–17/9
2,600,000	,,	,,	3⅔	3⅔	Do. 3½ p.c. max.	60–62*	..	60¾ 61
4,157 020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	75–78*	..	76½–77½
5,602,620	,,	Dec. 19	3	3	Do. 3 p.c. Con. Deb.	56–59	–½	57–58
3,642.770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	97–100	..	99–100
82,500	,,	Aug. 29	7	7	Hastings & St. L. 5 p.c. Conv.	98–103	..	..
258.740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	78–83	..	78½
70 600	10	Oct. 10	†10	†10	Hongkong & China, Ltd.	13¾–14¾	..	..
213,200	Stk.	Aug. 29	6	6	Hornsey Con. 3½ p.c.	90–93	..	..
1,976,000	,,	Nov. 1	20	10	Imperial Continental Cap.	360–380	..	360–372
223,130	,,	Feb. 6	3½	3½	Do. 3½ p.c. Red. Deb.	70–75	..	..
235,242	,,	Aug. 15	8	8½	Lea Bridge 5 p.c. Ord.	115–118	..	117–118
2,145,907	,,	Feb. 20	6	6	Liverpool 8 p.c. Ord.	88½–89½*b*	..	..
600 000	,,	Sept. 26	7	7	Do. 7 p.c. Red Pref.	100½–102½*b*	..	..
165,736	,,	Feb. 20	9	8	Maidstone 5 p.c. Cap.	119–124*	..	..
63,480	,,	Dec. 19	3	3	Do 3 p.c. Deb.	53–55	..	..
75,000	5	Dec. 5	†10	†10	Malta & Mediterranean Metrop'litan (of Melbourne)	5½–6	..	..
392,000	—	Oct. 1	5½	5½	5½ p.c. Red. Deb.	92–95	..	..
541,920	Stk.	Nov. 21	†9	†6	Montevideo, Ltd	107–112	..	..
2,061,315	,,	Feb. 20	5⅝	5⅝	Newcastle & Gateshead Con.	16/3–16/9*df*	+·/4½	..
682.856	,,	,,	4	4	Do. 4 p.c. Pref.	70½–71½*d*	..	..
691,705	,,	Dec. 19	3½	3½	Do. 3½ p.c. Deb.	66½–67½*d*	..	..
169,940	,,	Aug. 29	7/1/0	7½	North Middlesex 6 p.c. Con.	112–117	..	..
396,160	,,	Feb. 6	5	5	Northampton 5 p.c. max.	74–77	..	..
300.000	,,	Nov. 21	7	9	Oriental, Ltd.	108–113	..	111½
60,000	5	13 My., '15	—	—	Ottoman	0–¼	..	..
205,162	Stk.	Jan. 9	8	8	Plym'th & Stonehouse 5 p.c.	107–110	..	..
424,416	,,	Feb. 20	8	8	Portsm'th Con. Stk. 4 p.c. Std	110–115*	..	..
241,446	,,	,,	5	5	Do. 5 p.c. max.	78–81*	..	..
2,334,464	1	June 27	—	15	Primitiva Ord.	27/—29/-	..	..
244,500	100	Dec. 2	4	4	Do. 4 p.c. Red. Deb.	92–95	..	..
695,000	Stk.	Jan. 23	4	4	Do. 4 p.c. Red. Deb. 1911	77–80*	..	79–79½
4.6.345	,,	Dec. 19	4	4	Do. 4 p.c. Cons. Deb.	77–80	..	..
150,000	10	Sept. 26	6	6	San Paulo 6 p.c. Pref.	8⅝–9⅛	..	8⅛
1,736 968	Stk.	Aug. 29	6¾	6¼	Sheffield Cons.	105–107*e*	..	..
95,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb.	76–78*e*	..	..
90 000	10	June 13	‡4	‡4	South African	4–6	..	..
6,709 895	Stk.	Feb. 20	5	7½	South Met. Ord.	97–99*	..	97–93½
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	106–108*	..	..
1,895 445	,,	Jan. 9	3	3	Do. 3 p.c. Deb.	55–58	..	57
734,000	,,	Sept. 12	6½	6½	Do. 6½ p.c. Red. Db.	99–101	..	100½
91,500	,,	Aug. 15	8½	8½	South Shields Con.	109–111*d*	..	..
1,543,795	,,	Feb. 20	6½	6½	South Suburban Ord. 5 p.c.	98–101*	..	99¼
468,837	,,	Dec. 19	5	5	Do. 5 p.c. Deb.	92–95	..	94½
647,740	,,	Feb. 20	5	5	Southampton Ord. 5 p.c. max.	75–78*	..	..
121,275	,,	Dec. 19	4	4	Do. 4 p.c. Deb.	69–72	..	..
179,014	,,	Feb. 20	8	8	Sutton Ord.	113–116*	..	114
67,828	,,	Jan. 9	5	5	Do. 5 p.c. Deb.	91–94	..	..
250,000	,,	Feb. 21	7	7	Swansea 7 p.c. Red. Pref.	100–102	..	..
200,000	,,	Dec. 19	6½	6½	Do. 6½ p.c. Red. Deb.	99–101	..	..
1,076,490	,,	Aug. 15	6⅝	6⅝	Tottenham District Ord.	101–106	..	103–105
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	97–100	..	..
199,005	,,	Dec. 5	4	4	Do. 4 p.c. Deb.	70–73	..	..
182,380	10	30 Dec., '12	—	—	Tuscan, Ltd.	4–5	..	4
85,701	Stk.	Sept. 26	6	6	Do. 6 p.c. Red. Deb.	75–80	..	..
303,094	,,	Aug. 29	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	97–102	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref.	85–90	..	85
1,185,970	,,	—	—	—	Wandsworth, Wimbledon, and Epsom Cons.	105–110	..	..
200,000	,,	Feb. 20	5	5	Do. 5 p.c. Pref.	85–90*	..	..
488,344	,,	Dec. 19	5	5	Do. 5 p.c. Deb.	91–95	..	..

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(This announcement is inserted gratuitously.)

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Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his One Exception.

Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated, and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d. a year to you. Send Peter and his handicapped pals 3d. for every year you've had it. Now, please, in case it slips your memory. Good idea!

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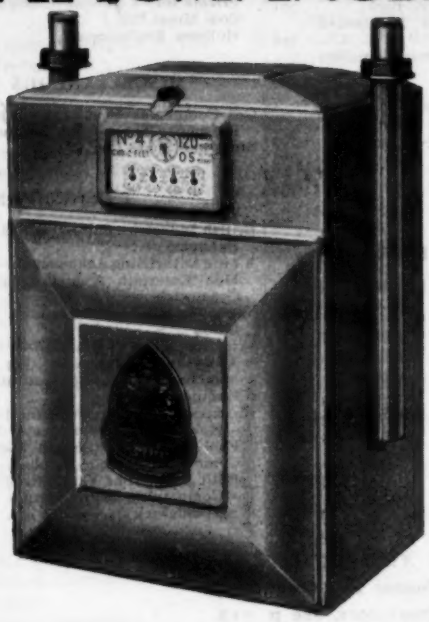

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